



Dynamics of the charcoal and indigenous timber trade in Zambia

A scoping study in Eastern, Northern and Northwestern provinces

Davison J. Gumbo
Kaala B. Moombe
Mercy M. Kandulu
Gillian Kabwe
Marja Ojanen
Elizabeth Ndhlovu
Terry C.H. Sunderland

Dynamics of the charcoal and indigenous timber trade in Zambia

A scoping study in Eastern, Northern and Northwestern provinces

Davison J. Gumbo

CIFOR, Zambia

Kaala B. Moombe

CIFOR, Zambia

Mercy M. Kandulu

Forest Department Lusaka Province, Zambia

Gillian Kabwe

Copperbelt University, Zambia

Marja Ojanen

Finnish Embassy, Zambia

Elizabeth Ndhlovu

Finnish Embassy, Zambia

Terry C. H. Sunderland

CIFOR, Indonesia

Occasional Paper 86

© 2013 Center for International Forestry Research
All rights reserved

ISBN 978-602-1504-02-4

Gumbo, D. J., Moombe, K. B., Kandulu, M. M., Kabwe, G., Ojanen, M., Ndhlovu, E. and Sunderland, T.C.H. 2013. Dynamics of the charcoal and indigenous timber trade in Zambia: A scoping study in Eastern, Northern and Northwestern provinces. Occasional Paper 86. CIFOR, Bogor, Indonesia.

Cover photo by Terry Sunderland
Photos by Davison Gumbo, except Figure 6 by Gillian Kabwe

CIFOR
Jl. CIFOR, Situ Gede
Bogor Barat 16115
Indonesia

T +62 (251) 8622-622
F +62 (251) 8622-100
E cifor@cgiar.org

cifor.org

Any views expressed in this publication are those of the authors. They do not necessarily represent the views of CIFOR, the authors' institutions or the financial sponsors of this publication.

Table of contents

Acknowledgements	v
Acronyms and abbreviations	vi
Preface	vii
Summary	viii
1 Introduction	1
1.1 Objectives	2
1.2 Methods	3
1.3 Selection of study districts	5
2 Literature review	11
2.1 Charcoal production	11
2.2 Charcoal trade	16
2.3 Regional forest management policy frameworks	18
2.4 Foreign direct investment and local land losses	19
2.5 The legal and forest policy framework in Zambia	20
3 Charcoal production and trade	23
3.1 The charcoal production cycle	24
3.2 Production areas	25
3.3 Species used in charcoal production	27
3.4 Production trends	27
3.5 Movement of charcoal to border towns and beyond	29
3.6 Routes and modes of transport	30
3.7 Charcoal production control mechanisms	31
3.8 Trading regulations for charcoal	32
3.9 Charcoal distribution and markets	32
3.10 Reasons for engaging in charcoal production	34
3.11 Markets for charcoal in border areas	34
3.12 Value addition along the trade chain	37
3.13 Cost structure of the charcoal value chain	38
4 Indigenous timber production and trade	42
4.1 Policy and institutional frameworks guiding timber production	42
4.2 Actors in timber production and trade	44
4.3 Timber production cycles and processes	44
4.4 Timber production	46
4.5 Marketplaces and buyers of indigenous timber	49
5 Conclusions and recommendations	52
5.1 Introduction	52
5.2 Findings	53
5.3 Methods and tools revisited	53
5.4 Revisiting specific objectives and outputs of the study	53
6 References	62
Annexes	69

List of figures and tables

Figures

1	Stages of the scoping study process	3
2	Provinces in this study (outlined in blue)	5
3	Northwestern province, showing study districts of Mwinilunga and Kasempa	6
4	SADC transport development corridors	10
5	A typical 50 kg bag of charcoal	24
6	A 50 kg bag of charcoal with a 30 cm head	24
7	A burning earth kiln in Nyimba district	24
8	Kiln under construction on land cleared for cultivation in Nyimba district	25
9	Site of a former kiln, showing limited tree regeneration	26
10	kaLicensi Kalipo (licence is available) - talking to a charcoal producer-retailer on the Chipata-Lundazi road	30
11	Female traders loading a 50 kg bag onto a Chipata-bound bus in Nyimba district	32
12	Approximate consumption of charcoal by district	33
13	Prices of charcoal in border towns	35
14	Example of generic charcoal trade flows (Eastern province)	37
15	Cost-benefit ratio for charcoal trading	40

Tables

1	Attributes of provinces studied	6
2	Volumes of commercial timber species by province	7
3	Characteristics of the study provinces and districts	8
4	Border towns included in scoping study	9
5	Literature search on use of charcoal in the study area	12
6	Trends in charcoal production and consumption	11
7	Tree species used for charcoal production	14
8	Informal charcoal and timber cross-border exports out of Tanzania 1995–1996	18
9	Abbreviations for districts and border towns in the study area	23
10	Sources of charcoal entering the study districts	26
11	Trees used for charcoal production	28
12	Do producers obtain permission to make charcoal?	30
13	Number of markets, quantities of bags and charcoal on the Luangwa-Chipata Road	31
14	External markets linked to the study districts	33
15	Reasons people engage in charcoal production in the various districts	34
16	Destinations of charcoal produced in or ferried through border areas	35
17	Peak months for charcoal prices in border towns	36
18	Months when charcoal prices are lowest in border towns	36
19	Charcoal production costs in a calendar year within the study districts	39
20	Prices for charcoal in districts	40
21	Requirements for issuance of forest logging licences in Zambia	43
22	Documents and costs associated with application for pit-sawing licence	45
23	Tree species extracted for timber	46
24	Timber production months	47
25	Local markets and routes for timber in border towns	47
26	Seasonal timber inflows into border towns	48
27	Sources of timber ferried through the districts	48
28	Markets for indigenous timber	49
29	Average prices of indigenous timber in districts	50
30	Seasonal variation in timber prices	50

Acknowledgements

We would like to record our gratitude to Vainess Phiri, Daniel Banda, Joseph Sambundu, Kingsley Muyeba, Mupelesi Siame, Rex Mukunta, Sarah Lunda, Christine Zulu and Miriam Suntwe, all of whom provided invaluable field support. We would also like to thank the District Commissioners for Chinsali, Nakonde, Mwinilunga, Kasempa, Nyimba and Katete, who graced the various district validation meetings.

We also note the contributions of the Provincial Extension Officers (Eastern, Northern and Northwestern), the Zambia Revenue Authority and representatives of the Forest Department, Agriculture, Social Welfare and District Councils.

Our special thanks go to their Royal Highnesses or their representatives who attended the district validation meetings.

We also thank the many charcoal and timber producers, traders, retailers and transporters who provided invaluable information for this study. Financial support for this study and the district validation meetings was provided by the Finnish Embassy in Lusaka, which is gratefully acknowledged.

The authors also thank two anonymous reviewers and James Culverwell for his editorial skills in the final preparation of this report.

Acronyms and abbreviations

CBR	Cost Benefit Ratio
CHAPOSA	Charcoal Potential in Southern Africa
CDM	Clean Development Mechanism
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COMACO	Community Markets for Conservation
COMESA	Common Market for Eastern and Southern Africa
CSO	Central Statistical Office
DRC	Democratic Republic of the Congo
EIA	Environmental Impact Assessment
EPPCA	Environmental Protection and Pollution Control Act
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility (The World Bank)
FD	Forest Department
FDHQ	Forest Department Headquarters
FDI	Foreign Direct Investment
GMA	Game Management Area
GDP	Gross Domestic Product
GPS	Global Positioning System
GRZ	Government of the Republic of Zambia
ICBT	Informal Cross-Border Trade
ICRAF	World Agroforestry Centre
JFM	Joint Forest Management
JICA	Japan International Cooperation Agency
MEWD	Ministry of Energy and Water Development
MWK	Malawian Kwacha
NGO	Non-Governmental Organisations
NJP	National Joint Programme
PFAP	Provincial Forest Action Programme
REDD	Reducing Emissions from Deforestation and Forest Degradation
RISDP	Regional Indicative Strategic Development Plan
SADC	Southern African Development Community
SEI	Stockholm Environment Institute
SFM	Sustainable Forest Management
SMFE	Small- and Medium-Scale Forest Enterprises
SSA	Sub-Saharan Africa
TZS	Tanzanian Shilling
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP - World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
ZAWA	Zambia Wildlife Authority
ZDA	Zambia Development Agency
ZRA	Zambia Revenue Authority
ZESCO	Zambia Electricity Supply Corporation
ZFAP	Zambia Forest Action Programme
ZIMOZA	Zimbabwe, Mozambique and Zambia
ZMM-GT	Zambia–Malawi–Mozambique Growth Triangle

Preface

This report presents the results of a scoping study in six districts in Eastern, Northern (now Muchinga) and Northwestern provinces of Zambia. The study highlights the significant contributions of both charcoal and timber to the livelihoods of rural households. Contrary to a general understanding that charcoaling always leads to deforestation, this study discovered that certain areas used for charcoal production for extended periods of time demonstrate the existence of sustainable, locally managed charcoal production systems.

The report calls for closer attention to local-level resource management systems based on traditional control mechanisms, formalised through by-laws at the district level. Such efforts should be supported by multi-disciplinary research covering the biophysical and social aspects of the charcoal and timber industries. In the case of timber, this study established the existence of an organised system of production and trade, but identified a need for producers, especially pit sawyers, to be actively supported and the licensing process affecting them decentralised.

Summary

Objectives of the scoping study

Together with the Finnish Embassy in Lusaka and other stakeholders, the Zambia Project Office of the Center for International Forestry Research (CIFOR) has been involved in the initial planning of a 'Decentralised Natural Resources Management Programme in Zambia'. As part of its contribution, CIFOR conducted a scoping study on the production and trade of charcoal and timber in Zambia with the following objective:

To identify and characterise the social, economic and environmental issues pertaining to charcoal and timber production and trade in Zambia, as well as the implications of the nascent regional charcoal industry.

Specific terms of reference were to:

- a. Identify and characterise the charcoal flows and trade trends in Zambia.
- b. Document institutional and socio-economic aspects related to the production, trade and consumption of charcoal.
- c. Identify the main policy and institutional arrangements governing charcoal production and commercial timber extraction.
- d. Carry out a comprehensive review of grey and published literature and data on charcoal and timber production and trade in selected countries in the southern African region.

The scoping study was conducted in six districts in Eastern, Northern (now Muchinga)¹ and Northwestern provinces and arrived at a series of findings from which a number

of recommendations were derived. These recommendations indicate measures to change the profiles of the production and trade of charcoal and timber in Zambia.

The process was underpinned by the following areas of inquiry, identified as prerequisites for the development of an understanding of the objectives of the scoping study:

1. Improve knowledge on charcoal and timber flows from source to markets in selected districts in Eastern, Muchinga (Northern) and Northwestern provinces of Zambia.
2. Determine key stakeholders and their respective roles in the charcoal and timber trade in selected districts in Eastern, Muchinga and Northwestern provinces.
3. Summarise governance structures involved in the charcoal and timber production and trade.
4. Improve knowledge of charcoal and timber flows to and from countries in the region.
5. Determine specific research, conservation and livelihood development activities that should be carried out under the proposed programme.

Methodology

To execute this study, CIFOR established a small technical team to conduct a literature review and, with the support of field-based researchers, conducted district-level interviews and informal discussions around border areas and international crossing points.

Following a thorough literature review, one-day meetings in each district validated the results of the scoping study. There were common findings from the six districts, including a realisation that a reduction of customary power and control by chiefs and local leaders in the management and

¹ Muchinga province was established by presidential decree after the study was completed, but the districts of Chinsali and Nakonde fall under this province; see <http://www.mlgh.gov.zm> (26 April 2012).

protection of the forest resources was contributing to widespread forest loss.

Major findings

Often blamed as major contributors to Zambia's 0.3% per annum forest loss, the largely undocumented charcoal and timber trade nevertheless make meaningful contributions to livelihoods and national income. The Forest Department (FD) is at the centre of efforts to address social and environmental impacts of the trade. The development, adoption and deployment of sustainable approaches embodying the relevance and roles of local-level institutions are likely to have meaningful impacts.

a. Charcoal production, consumption and trade

Urban centres drive demand for charcoal and, as such, it is widely produced throughout Zambia. Charcoal production is inevitably followed by associated environmental problems such as the depletion of preferred species, forcing producers to resort to lesser-used species and, critically for livelihoods, food-bearing trees. Where charcoal is produced in quantity, localised deforestation has been noted.

The study confirmed that poverty, lack of employment and limited livelihood options are major factors behind charcoal production. A broad range of stakeholders finds the practice to be lucrative, requiring minimal investment. Some producers claimed that areas in their respective districts have been producing charcoal for up to 10 years without an immediate loss of the resource: such claims merit further investigation. Various legislative gaps have been exploited by charcoal producers and, coupled with the ease of entry into the charcoal business, as well as limited monitoring by the FD, illegal activities around charcoal have not been actively discouraged.

With Zambia's urbanisation rate projected at 3.2% per annum, it is likely that, in the absence of alternative energy sources, charcoal demand will increase, as will the rate of charcoal production; both supply and demand issues will need to be addressed.

The study noted that policies and institutional arrangements governing charcoal production are generally not applied due to a lack of human and fiscal resources and complex bureaucracy. At the producer level, relevant policies are largely unknown. Regulatory issues that should be reviewed are pricing of licences, points of issue and costs of licence registration, as well as better organisation of charcoal producers. Current policies and institutional arrangements affecting charcoal production do not allow charcoal producers to organise themselves into groups or cooperatives. Correspondingly, communities, or villages with forest resources suitable for charcoal production, cannot exclude outside producers under the present law.

With traditional rules on use of forest resources becoming diminished, chiefs feel they no longer have tangible control over forest issues. Yet they are expected to make recommendations on who can produce charcoal and where. Their ability to deal with rule-breakers has now been passed on to the courts, further accelerating the breakdown of traditional forest management rules and regulations.

Traditional rules once provided the basis for district-level by-laws. These rules need to be formalised and become the foundation of local natural resources management. District councils have now assumed a leadership role in this regard, extracting levies on forest products such as charcoal, and seldom reinvesting in forest management in their districts. The FD only provides extension services; with disempowered chiefs and district councils seemingly interested only in taxing forest products, a management gap has promoted illegal charcoal-producing activities of which producers have taken advantage.

The study highlighted a broad array of state and non-state actors dominated by charcoal producers, government service providers, traders, transporters, retailers and vendors, some of whom have multiple roles in the value chain. Linkages within and between most non-state actors are largely based on cash payments. In the past, women have been known to be retailers and petty traders in the value chain. However, this study established that women were becoming charcoal producers, effectively challenging the assertion that charcoal production is a male-dominated activity. Youth are

also involved in producing charcoal, transporting it to markets and selling it door-to-door in urban centres.

Most charcoal production reviewed by this study was traded and consumed in district centres and major towns across Zambia. There were claims that, as a result of higher prices paid in neighbouring countries, charcoal is moving across borders in haulage trucks and through cross-border traders.

b. Timber production, consumption and trade

Production of timber from indigenous trees is prevalent where suitable trees still occur. Stocks have been noted to be in decline in the Western and Southern provinces (and in other regions in Zambia). Current literature indicates that merchantable sizes of species such as *Baikiaea plurijuga* have declined, leading to calls for better management of the resource base. Merchants who hire villagers to cut logs for a designated fee without the necessary legal clearance further promote illegal production.

The production and trade of timber are largely formal activities by definition, limited to planks and semi-finished goods. The institutional and policy framework in use is the Forest Act of 1973. Licences are issued by the Forest Department Headquarters (FDHQ), requiring aspiring pit sawyers to travel to Lusaka without guarantees they will get the licence.

On the plus side, the greater number of licences granted to pit sawyers is viewed as a major contribution to poverty alleviation. Still, pit sawyers feel disadvantaged due to limited capital, poor equipment and lack of business training. District validation meetings indicated that most pit sawyers operate illegally.

As with charcoal, traditional leaders and district councils seem less concerned about the impacts of the operations of timber producers on the forests; as a result, there are no institutions that can meaningfully help the FD pursue its objective of better forest management.

The timber trade, including exports, is permitted but round wood is currently banned; export of planks is promoted instead. The production process is dominated by pit sawyers operating in registered groups, few of which take part in direct timber transportation.

Timber flows follow similar patterns to those observed for charcoal, but another dimension was added in the form of saw millers (both formal and informal) who may purchase or process logs for pit sawyers.

Major recommendations of the study

a. Charcoal production

- i. Efforts should be directed towards restoring areas that have been degraded through charcoal production, starting with environmentally sensitive areas such as riverbanks.
- ii. Schemes to promote sustainable charcoal production should be developed with producers, building on lessons learned from areas in customary land where charcoal production has been taking place for long periods.
- iii. Special support must be provided to women charcoal producers to ensure they carry out their work within the confines of the law.
- iv. Working with chiefs and district councils, communities should develop local rules and guidelines for managing forests, through which timber can be made available to charcoal producers for a fee. Traditional rules of forest management could be a good foundation for management plans.
- v. Municipalities, district councils and other local government authorities should be encouraged to work with charcoal consumers in areas under their jurisdiction so they (the users) can adopt energy-saving stoves and other conservation measures and technologies.

b. Timber production

- i. Remote sensing data, concession management plans and records should be used to determine vegetation change before and after logging in selected sites.

- ii. Licences for pit sawyers should be granted by provincial offices, as it is difficult for most applicants to travel to Lusaka. Requirements for obtaining a licence are too stringent for the average pit sawyer.

It was also recommended that:

- i. Better understanding of the implications of charcoal and timber production on the forests be developed, in light of climate change, increased community participation, REDD+, carbon markets and other initiatives.
- ii. District councils, chiefs and other local-level institutions be encouraged to take a greater interest in the management of forests, especially those being used for charcoal and timber production, through the enactment of by-laws. Current by-laws only cover the generation of levies.
- iii. Both charcoal producers and pit sawyers be provided with technical and business training so they can contribute to better management of their resources.

1 Introduction

Charcoal, timber and non-timber forest products (NTFPs) are part of a broad range of forest resources extracted from the miombo woodlands of eastern and southern Africa,² which have a long history of providing direct support to rural and urban livelihoods. While the revenue generation capacity of timber is obvious, NTFPs have only recently attracted comparable attention (Shackleton *et al.* 2011). Charcoal and timber provide a basis for potentially viable forest-based enterprises; if adequately planned, these enterprises can contribute meaningfully to the national economy, while benefiting both rural communities and forests (Timko *et al.* 2010).

As observed by Roe and Nelson (2009), older forest policies tended to promote centralised forest management with little or no regard for their contribution to rural and forest-dependent communities. However, there is currently unprecedented recognition of the roles of these previously overlooked forest-management stakeholders (Molnar *et al.* 2004; Fisher *et al.* 2007). Driven by the need to address unsustainable forest use, governments are increasingly promoting small- and medium-forest enterprises (SMFEs) through which communities can gain a greater stake in the management of forest resources (Sam and Shepherd 2011). The range of forest products within this category is broad, but those most likely to have negative environmental impacts (such as charcoal and timber production) should be addressed in the first instance (Ahenkan and Boon 2011).

Charcoal and firewood are collectively referred to as fuelwood, a major source of cooking and heating energy for most urban households in sub-Saharan

² Miombo is a woodland type covering a total area of 2.7 million ha in eastern and southern Africa, dominated by trees of the genera *Julbernardia*, *Brachystegia* and *Isoberlinia* (Dewees *et al.* 2010).

Africa.³ However, according to the Government of the Republic of Zambia, charcoal production is a major driver of deforestation and environmental degradation (GRZ 2010). Zambia's annual rate of deforestation is 0.33%, a quarter of which of is reportedly due to charcoal production (Kalinda *et al.* 2008). Charcoal production is driven by urban demand, with a typical Lusaka household consuming an estimated 1.3 tonnes of charcoal per year. To produce this amount of charcoal, close to 8 tonnes of wood is required and the effects on forests have been noted as being largely negative (Mulombwa 1998; Hibajene and Kalumiana 2003; GRZ 2010). However, a body of knowledge challenges the assumption that charcoal production leads directly to deforestation (Chidumayo 2010).

In most urban areas where charcoal is used, demand is driven by poverty and limited availability of affordable and cleaner energy alternatives. In the city of Lusaka, about 85% of urban households use charcoal, compared to 15% in rural areas (Technoshare Associates 2011). It can be assumed that increasing urbanisation will result in greater charcoal demand and higher rates of deforestation (WEC 2004; May-Tobin 2011). In the past, the environmental impacts of charcoal production have received more attention than their contribution to livelihoods and poverty alleviation. Questions are being asked on how to address deforestation and forest degradation so that sustainable charcoal production and trade can continue to contribute to people's livelihoods.

Zambia has close to 340.2 million m³ of indigenous timber (Mukosha and Siampale 2008). It is used for general construction in rural areas; for pit props and structural timber in the mining industry; and for furniture-making and

³ The FAO estimates that 50–80% of sub-Saharan households depend on charcoal (FAO 2010).

joinery across the country. This places heavy pressure on the resource base. According to the Zambia Development Agency (ZDA), processed timber from tree species such as mukwa/kiat (*Pterocarpus angolensis* D.C.), muzauli/African rosewood (*Guibourtia coleosperma* J.Léonard) and Zambezi teak (*Baikiaea plurijuga* Harms.) is being exported to the Southern African Development Community (SADC) region and beyond (ZDA 2011). Extraction of indigenous timber is permitted under a system of forest concessions and pit sawing licences, with additional licences and documentation required for moving and/or exporting the timber (Whiteman 2001).⁴

As with charcoal production, logging in Zambia has been cited as a major contributor to deforestation and forest degradation (GRZ 2010). Unlike charcoal, however, there is no equivalent information on the societal contributions of logging; yet, logging is a source of livelihood for scores of pit sawyers country-wide, especially in Muchinga, Northwestern and Western provinces (Mukosha and Siampale 2008). Logging in miombo woodlands is generally selective, but as with logging elsewhere the process of accessing targeted trees has environmental and social costs (Karsenty *et al.* 2008). Such costs, which often include the loss of potentially valuable NTFPs or habitats, have not been adequately quantified in Zambia. According to Schwartz *et al.* (2002), however, working in Tanzanian miombo has led to substantial losses. Unlike charcoal producers who obtain production licences at short notice at FD district offices, pit sawyers go through an annual application process where approval is provided by the FDHQ in Lusaka.

Zambia's trading partners are largely limited to the SADC region, which supplies 56% of Zambia's imports and absorbs about 50% of its exports. The SADC region is also increasingly important to Zambia as a market for both non-traditional and traditional exports (SADC 2008).⁵ This observation is supported by reports from the ZDA (2011) and SADC (2006) indicating that indigenous timber and by-products are being marketed in surrounding countries, especially South Africa. For example, between 2000 and

2004, Zambia exported wood, wood articles and wood charcoal worth ZMK 54.2 million (Customs code H44). However, the percentage contributed by wood and charcoal, or whether they were manufactured by rural communities, are unclear (SADC 2008).⁶ There have been recent unsubstantiated reports that Zambian charcoal forms part of the informal cross-border trade (ICBT) prevalent across the region (Lesser and Moisé-Leeman 2009); according to Sibale and Banda (2004), informal charcoal-trading does take place between Zambia, Tanzania, Mozambique and Malawi. Recognising charcoal and timber as a source of revenue for rural communities in Zambia is a positive development. However, the environmental and social impacts on local economies and respective sources should be examined when communities engage with the practice. In so doing, potential foci for future research, conservation and livelihood development can be identified and incorporated into future initiatives promoting trade in these commodities. This is the basis for this scoping study and report.

1.1 Objectives

The objective of this scoping study was to identify and characterise social, economic and environmental issues pertaining to trade in charcoal and timber in Zambia, as well as the institutional implications (policy, governance and political) of the associated regional trade in both commodities. The study focused on the following specific objectives:

- a. Identify and characterise charcoal flows and trade trends in Zambia.
- b. Document institutional and socio-economic aspects related to production, trade and the consumption of charcoal.
- c. Identify the main policy and institutional arrangements governing charcoaling and commercial timber extraction.
- d. Carry out a comprehensive review of grey and published literature and data on charcoal and timber production and trade in selected countries in southern Africa.

The scoping study included indicative value chain analysis of marketable wood-based

⁴ See Licences in Forestry: <http://www.mtenr.gov.zm>

⁵ SADC (2008) <http://www.sadctrade.org/files/Intra-SADC-trade-performance-review-2006-8-zambia.pdf>

⁶ SADC (2008) <http://www.sadctrade.org/files/Intra-SADC-trade-performance-review-2006-8-zambia.pdf>

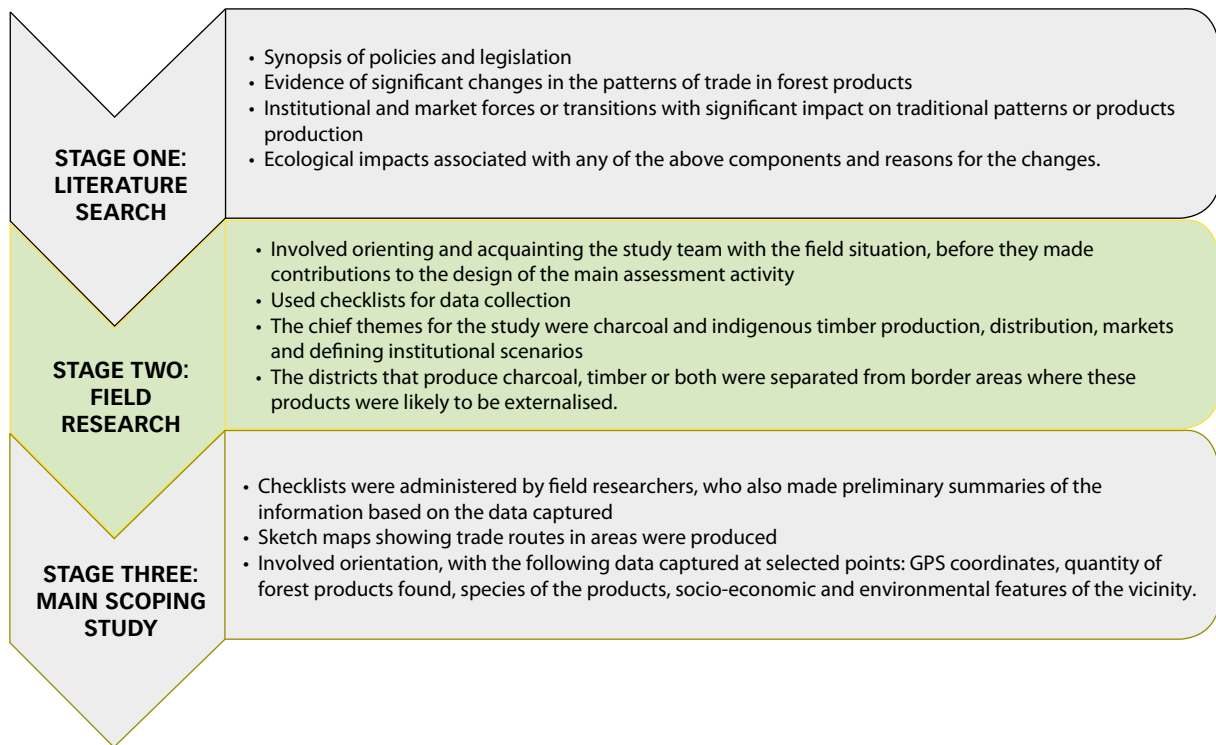


Figure 1. Stages of the scoping study process

products⁷ to obtain information on, and make recommendations about, valuable wood-based products and their potential markets, as well as value-added options.

1.2 Methods

The scoping study followed accepted practice in reviewing relevant published and unpublished documents, synthesising information and producing a narrative account (Ritchie and Spencer 1994; Pawson *et al.* 2002).

Scoping is a process to determine a range of issues of specific interest, and can also identify issues relating to a proposed action (Levac *et al.* 2010). The extent and type of a given research activity may also be mapped using this approach (Grant and Booth 2009).

While past scoping studies have focused on literature reviews, there is an increasing tendency to incorporate consultations into the study. In so doing, national statutory and voluntary bodies, professionals and key informants knowledgeable in the area under study are consulted, which helps contextualise emerging issues (Newbronner and Hare 2002; Levac *et al.* 2010). The processes associated with scoping studies are thus ‘not linear but iterative, requiring researchers to engage with each stage in a reflexive way’ (Arksey and O’Malley 2005).

This study was a precursor to a more thorough systematic study on charcoal production and trade in Zambia. As already indicated, a literature review was the core element of the study, which was linked to interviews and discussions with key institutions and informants. The study noted that trade analyses of individual forest products such as charcoal and indigenous timber often combine harvesting, processing, sale and consumption, without clear distinctions between them. To address this, information on the following aspects were gathered: producer and trader; product preparation and price; origin and destination

⁷ Developing interest in ebony (*Dalbergia melanoxylon*), mubanga (*Pericopsis angolensis*) and ndale (*Swartzia madagascariensis*) in the manufacture of piano keys, carvings, gun butts and stocks in the Far East is a case in point.

of goods; methods of payment; modes of transportation; contract and hire arrangements; infrastructure; packaging; marketplace environment; popular units of measure; and end uses.

The study commenced by looking at the end part of the charcoal and timber process (the market), followed by transporters, wholesalers and retailers, and finally at producers. To capture data and information during each step of this study, the task was divided into three stages, i.e. two less than suggested by Arksey and O'Malley (2005).

1.2.1 Stage One: Literature search

A literature review through which existing knowledge can be synthesised and then used during the consultative stage is the core of any scoping study. Key thematic areas identified were:

- a. A synopsis of national policies and legislation governing production and trade of charcoal and timber
- b. Evidence of significant changes in trade patterns in selected forest products over the last 10 years
- c. Institutional and market forces/transitions that have had significant impacts on traditional patterns of production and harvesting of the selected forest products (e.g. regional market integration and changes in land/forest tenure)
- d. Impacts on local livelihoods associated with changes in a) and b) above, and reasons for the changes
- e. Ecological impacts associated with any of the changes in c) and d)
- f. Changing patterns of domestic consumption of different energy sources

Two issues arise following a review of the methodology used. First, the study placed great emphasis on a review of existing literature where access to both published and unpublished documents was considered critical. Failure to obtain documents such as district and provincial plans and concession data had a profound impact on the study outcomes. Second, the limited extent to which people were willing to provide information about charcoal and timber production and trade (which are characterised by various forms of 'illegalities') was a major challenge. These anticipated problems were noted early on during the search for background information; the team

attempted to address this by having more detailed discussions with the parties concerned. The team also learned early in the study that inputs from local persons would be needed if useful and pertinent information was to be obtained.

1.2.2 Stage Two: Engaging field-based research assistants

Provinces targeted for the scoping study were Eastern, Muchinga (formerly a part of Northern province) and Northwestern. These provinces all share international borders with neighbouring countries, and it is presumed that cross-border trade in charcoal and timber is taking place. Early in the study, the team recognised the need to include border towns from where charcoal and timber products are likely to be exported; seven border towns and international crossing points were identified and analysed together with districts originally targeted by the study. Some districts such as Katete, which shares a border with Mozambique, presented an additional dimension.⁸

The team recognised that, to obtain useful information on the movement of charcoal and timber in the selected districts and border towns, it would be necessary to 'embed' members in these areas (Leann *et al.* 1998; Nijkamp 2009). However, there was insufficient time to do that. What the study needed were people within the industry who understood and had inside information on aspects of the local charcoal and timber trades. As an example, it was anticipated that such people would know the key times that traders and transporters returned to district and border towns from charcoal- or timber-sourcing areas. To this end, 11 field-based researchers living in the selected districts and border towns were hired.

Using information from the literature review, field visits took place primarily to orient and acquaint both the study team and field-based research assistants with the sites and proposed methodology. The visits guided the field research assistants on key thematic areas of the study such as charcoal

⁸ Although Chililabombwe and Chipata districts are regularly mentioned in this report, they were not specifically selected for study; their respective proximity to the developing border posts of Kasumbalesa and Mwami led to their inclusion in this analysis.

and timber production, distribution, markets and institutional scenarios. This stage was also used to pre-test the data collection tool through interviews with people involved with various stages of the charcoal and timber trade. Through these visits, a checklist was developed to collect and summarise gathered information (Annex 2).

1.2.3 Stage Three: Fieldwork

The third and final part of the scoping study involved the field-based researchers administering the checklist mentioned above. Two issues were identified during initial reconnaissance trips. First, the initial plan of making sampling stops every 50 km from border towns and 25 km on direct feeder roads until forest products trade was seen to lessen or to shift towards other products was dropped; reconnaissance visits indicated totally different market patterns to those anticipated. Instead, clusters of roadside markets of charcoal and/or timber were taken as sampling points. Second, district-level feeder roads to central business districts needed to be monitored vis-à-vis inflows or outflows of charcoal and timber; therefore, roadside market clusters were also used.⁹

At each of these roadside market clusters the following activities were carried out:

- GPS coordinates were recorded.
- People were asked about the likely markets for their products.
- Quantities (weight/volume/number) of forest products and their units of measurement were noted.
- Types and species of commonly harvested forest products were noted.
- Socio-economic and geophysical characteristics of sampling points were noted, as well as vegetation type/s and natural resources.

Field observations

Samples were random, consisting of charcoal and timber trade stakeholders such as producers, wholesalers, retailers, transporters and institutional players such as the Forest Department, Zambia Revenue Authority (ZRA) and Customs, as well as traditional and local authorities such as chiefs,

village heads, politicians, municipalities and the police. Sampling days were selected randomly to capture weekly variability; observations were made at regular times of the day to capture inflows and outflows of charcoal along specific routes. These observations were extended to selected border areas, and were mainly conducted from the Zambian side of the border.

District validation meetings

Six district validation meetings were held, where results from all of the districts involved in the study were presented and discussed; dialogue focused more on results pertaining to a given district. A cross-section of district stakeholders was invited, who openly debated issues surrounding the production and trade of charcoal and timber in their respective districts, and suggested ways of improving accountability at the community level. The meetings also examined how such ventures could be run under a decentralised management system (see Annex 3 for a list of invited institutions and organisations).

1.3 Selection of study districts

The study was conducted in the three provinces of Eastern, Muchinga and Northwestern (Figure 2), which were selected by the Finnish Embassy in



Figure 2. Provinces in this study (outlined in blue)

⁹ This was guided by the national categorisation of roads.



Figure 3. Northwestern province, showing study districts of Mwinilunga and Kasempa

Source: Makano and Moombe (2012)

Lusaka. The embassy was developing its 'Innovative Programme on Integrated Forest Management Programme for Zambia'. It wanted to work in two provinces rich in forest resources and in densely populated rural areas such as Eastern Province.

Charcoal production and timber harvesting are important livelihood activities in all three provinces. The Finnish Embassy has since changed the focus of this programme to 'A Decentralised Natural Resources Management Programme for Zambia'. However, the objectives have not changed and charcoal and timber production and trade are still viewed as potential income-generating undertakings for rural communities.

Provinces were selected during two working sessions involving a mix of experts. They were eventually adopted at a wider meeting comprising provincial permanent secretaries, chief planners, councillors, planners, forestry personnel (principal forest extension and district forest officers, agricultural officers and chiefs) (Ojanen and Ndhlovu 2010).

Northern province (now subdivided through creation of the new Muchinga province) is at 147 835 km² by far the largest of the provinces in the study, while Eastern province (69 100 km²) is the smallest (Ndhlovu 2010). The dominant

Table 1. Attributes of provinces studied

	Province		
	Eastern	Northern	Northwestern
<i>Size (km²) (a)</i>	69 100	125 825	147 835
<i>No. of districts (a)</i>	7	9	7
<i>Popn. (b)</i>	1 700 000	1 900 000	710 000
<i>Incidence of poverty (%)</i>	79	78	72
<i>Forest cover (%) (c)</i>	10.3	14.4	20.1
<i>Economic activities (c)</i>	Cropping (including subsistence), forestry, charcoal	Cropping (including subsistence), forestry, charcoal, NTFPs, fishing, wildlife, mining and quarrying	Timber, finkubala caterpillars, charcoal, crops (including pineapples) and livestock, slash and burn, mining and quarrying, forestry, honey production
<i>Selected natural resource concerns</i>	Drying of streams, soil erosion, depletion of wildlife, deforestation, illegal charcoal	Deforestation, illegal charcoal and timber production, shifting cultivation, wildlife depletion	Deforestation, illegal charcoal and timber production, shifting cultivation, wildlife depletion
<i>Borders shared (d)</i>	Mozambique, Malawi	Tanzania	Angola, DRC

Sources: (a) Ndhlovu (2010); (b) CSO (2010); National Population Census; (c) Bwalya-Mukumbuta (2004); Mwenya (2004); Mukosha and Siampale (2008); (d) www.zra.org.zm; and (e) Solwezi district state of the environment report (2008).

Table 2. Volumes of commercial timber species by province

Provinces	Commercial timber by forest types (million m ³)				
	Evergreen	Semi-evergreen	Deciduous	Other forests	Total
Central	0.0	44.5	1.5	0.0	46.0
Copperbelt	0.0	21.6	0.3	0.0	21.9
Eastern	0.0	9.1	18.7	0.0	27.8
Luapula	0.0	16.9	0.0	0.0	16.9
Lusaka	0.0	5.2	0.0	0.0	5.2
Northwestern	9.5	99.9	2.9	1.2	113.5
Northern	0.1	21.6	14.2	0.0	35.8
Southern	0.7	2.5	10.1	0.0	13.3
Western	0.0	34.8	25.0	0.0	59.8
Total	10.2 (3%)	256.0 (75.3%)	72.6 (21.3%)	1.2 (0.4%)	340.1 (100%)

Source: Mukosha and Siampale (2008)

land use throughout the three provinces consists of subsistence agriculture, primarily slash and burn in Northern and Northwestern provinces and cash cropping in all three provinces; the latter is more common in Eastern province (Kasali 2007). Poverty is still widespread in Zambia, which has a direct bearing on charcoal production. However, rural poverty fell 12 points between 1994 and 2006 from 83% to 76.3%, an indication that poverty is being reduced (CSO 2010).¹⁰ In the provinces falling under this study, CSO (2006a) showed the prevalence of poverty in rural areas varied from 79%, 78% and 72% for Eastern, Northern and Northwestern provinces, respectively. In a separate report before the CSO results were publicised, Jayne *et al.* (2011) showed that 2010 levels of rural poverty were unlikely to fall below 74% countrywide. Commitment to reducing poverty levels has been repeatedly stated, but significant changes have not been noted (GRZ 2011). The three study provinces support disparate amounts of indigenous timber resources; Northwestern possesses close to 33.3% of all national timber resources, followed by 10.2% and 8.2% for Northern and Eastern provinces, respectively (Table 2).¹¹ Together, the three provinces contribute more than half (about 52.1%) of total timber volume in Zambia.

Two districts in each province were selected through a consultative process undertaken by the Finnish Embassy. Criteria used included the existence of clear, local-level institutional arrangements regarding natural resources management (from village to district), as well as the presence of sound district-level financial management systems. Through field visits by the Finnish Embassy, the districts of Nyimba and Katete (Eastern), Chinsali and Nakonde (Northern) and Kasempa and Mwinilunga (Northwestern) were selected. Resources of these districts are discussed further in this report, but are not significantly different from those of the provinces in which they are located.

In rural Zambia, households derive the bulk of their income from subsistence agriculture (crops and livestock) that is typically insufficient to ensure household food security. The introduction of cash crops such as cotton and tobacco has led to significant growth in rural income levels in districts such as Katete. However, such developments do not necessarily reach extremely poor households (CSO 2006a); they often derive the bulk of their incomes from the sale of forest products such as charcoal, timber and edible caterpillars. Figures vary, but such products can contribute between 30% (Mutamba 2007) and 32% (Mulenga *et al.* 2011) of household incomes. While NTFPs are viewed as a survival strategy for the poor, some better-off households trade them in times of need (Shackleton and Gumbo 2010; Shackleton *et al.* 2011). Almost all of the selected districts

10 See Central Statistical Office (2010): *Poverty Trends Report, 1996–2006*.

11 See Mukosha and Siampale (2008), *op. cit.*, p. 55a.

Table 3. Characteristics of the study provinces and districts

Province/ District	Attributes				
	Area (km ²) (b)	Pop. (c)	Pop. density (persons/ km ²) (c)	Income sources	State of environment
Eastern					
Katete (a)	3987	240 818	60.4	Subsistence agriculture (including livestock); cash cropping (tobacco and cotton); charcoal production.	Woodland cover poor; clearance for agriculture; tobacco-curing; charcoal production (brick-making).
Nyimba	10 449	85 684	8.2	Subsistence agriculture (including livestock); cash cropping (tobacco and cotton); charcoal and timber production.	Reasonably well-wooded, hilly, forests being cleared for agriculture; charcoal production; brick-making; high likelihood of erosion especially in hills.
Northern					
Chinsali (now Muchinga)	15 400	147 845	9.6	Subsistence agriculture including slash and burn (<i>chitemene</i>); edible caterpillars (<i>finkubala</i>); mushroom-harvesting and sale; charcoal and timber production.	Good woodland cover, threatened by agricultural expansion; <i>chitemene</i> ; charcoal production; unsustainable timber harvesting.
Nakonde	4628	118 017	25,5	Subsistence agriculture (including <i>chitemene</i>); edible caterpillars (<i>finkubala</i>); mushroom-harvesting and sale; charcoal and timber production.	Woodland cover fair to moderate, threatened by agricultural expansion; <i>chitemene</i> ; charcoal production; unsustainable timber harvesting.
Northwestern					
Kasempa	21 100	65 730	3.2	Subsistence agriculture (including <i>chitemene</i>); charcoal and timber production; small- and large-scale mining; <i>finkubala</i> ; mushrooms; beekeeping and hunting.	Good woodland cover, threatened by agricultural expansion; <i>chitemene</i> ; charcoal production; unsustainable timber harvesting.
Mwinilunga	21 070	132 688	6.3	Subsistence agriculture (including <i>chitemene</i>) and pineapples; small- and large-scale mining; charcoal and timber; <i>finkubala</i> ; mushrooms and beekeeping.	Good woodland cover, threatened by agricultural expansion; <i>chitemene</i> ; mining; charcoal production; unsustainable timber harvesting.

Sources: (a) Katete District Development Plan (2008); (b) computed from (c) Mwenya (2004); CSO (2010)

Table 4. Border towns included in scoping study

Province	Major Road	Border town	Country	Possible ports
Eastern	Great East	Mwami Ukwimi	Malawi/ Mozambique Mozambique	Nacala, Beira (Mozambique), Dar es Salaam (Tanzania)
Northern	Great North	Nakonde	Tanzania	Dar es Salaam (Tanzania)
Northwestern	Chingola-Solwezi	Jimbe	Angola/DRC	Lobito (Angola)
Copperbelt	Ndola- Chililabombwe	Kasumbalesa	DRC	Lobito (Angola)
Southern	Lusaka-Kafue Chirundu	Chirundu Kazungula	Zimbabwe Botswana	Durban, Port Elizabeth (South Africa) Beira (Mozambique), Walvis Bay (Namibia)

Source: www.zra.org.zm/ZRA_presence.php

produce charcoal and some timber, but timber production is more common in Muchinga and Northwestern provinces.

This study also sought to establish the extent of cross-border trade in charcoal and timber. Zambia is a landlocked country, sharing borders with eight countries (Angola, Botswana, Democratic Republic of Congo, Malawi, Mozambique, Tanzania, Namibia and Zimbabwe (Figure 4). All of these countries enjoy excellent trade relations with Zambia through more than 18 formal border-crossing points. A total of 10 formal border crossings were noted in the study areas: four in Eastern, five in Muchinga and one in Northwestern.

From the list of border-crossing points, one site per province was selected on the assumption that charcoal and timber were among goods being exported through them.¹² Further active border crossings were also selected outside of the study provinces, such as the one-stop borderposts of Chirundu (Kwaramba 2010) and Kazungula (Southern province), and Kasumbalesa (Copperbelt province). The team assumed these crossing points adhered to formal border clearance procedures and that it might consult records of charcoal and timber movements.

Border towns shown in Table 4 are linked to the hinterland through an elaborate transport network dominated by the Great East, Great North (extending to Nakonde) and the Lusaka-Chirundu roads, as well as the Livingstone-Kazungula-Sesheke and Chingola-Solwezi-Mwinilunga highways. These roads are supported by a series of feeder roads linking rural areas and the major charcoal-producing areas with district and urban centres.

In addition, these roads are linked to a railway network, the role of which in moving charcoal is not yet clear. Each border town is linked directly or indirectly by road and/or rail to maritime ports within the SADC region (Mokoena 2007; Makumbe 2012). For example, goods moving through Eastern province's Mwami borderpost can be transported abroad by road and rail through Malawi to Dar es Salaam in Tanzania or, more recently, through Mtwara port or the Mozambique port of Nacala.

Goods passing through Chirundu can be moved via Zimbabwe to either Beira (Mozambique) or Durban or Port Elizabeth (South Africa). Some of these ports are part of SADC's proposed trade corridors that, in several cases, have required upgrading. Reference to these routes is important, as two of them (Dar es Salaam and Beira) were mentioned in reports involving illegal movement of timber in the mid-2000s (Mackenzie 2006; Milledge *et al.* 2007).

¹² <http://www.zambia-advisor.com/Zambian-Border-Posts.html>



Figure 4. SADC transport development corridors

In summary, this section provides a general background to the report in terms of defining the study areas, as well as the methods and tools used to carry out the study.

The study's multi-stage consultative process highlighted a number of issues around the charcoal and timber production and trade in Zambia and its neighbours. The following section presents the results of the study as:

- a. Results of the literature search on the charcoal and timber trade
- b. Observations from field missions, interviews and district validation meetings
- c. Conclusions and recommendations

2 Literature review

Over 51 documents were reviewed. To aid the reviewing process, four categories were considered, namely: (i) country, (ii) key focus area, (iii) regional inference and (iv) trade (both formal and informal). Each paper was assessed in terms of the extent to which it addressed issues pertaining to charcoal production and consumption. Given that eastern and southern African countries have large areas covered by miombo woodlands (Deweese *et al.* 2010), the review also considered whether a paper contributed towards a regional understanding of either the production or trade of charcoal or timber. Lastly, the review looked at whether a document specifically mentioned issues pertaining to the charcoal trade either at national, regional or international levels (Table 5).

Of the 51 publications and reports reviewed, 29 focused on Zambia, while 5, 4 and 2 covered Tanzania, Malawi and Mozambique, respectively. Papers and reports covering more than two countries were treated as ‘regional’ and placed in the same category as those covering charcoal issues in sub-Saharan Africa (SSA), SADC and the Common Market for Eastern and Southern Africa (COMESA), a category totalling 12 papers. Of all papers reviewed, more than 30 focused on charcoal production and its contribution to deforestation.¹³ They invariably covered its consumption as well as issues relating to domestic markets, but rarely raised issues pertaining to regional and international markets. The team was unable to find sufficient literature covering timber production and trade; hence, they are not included in Table 5.

Key observations made based on the literature review are discussed below.

2.1 Charcoal production

Charcoal accounts for 70% of Zambia’s energy requirements (Serenje *et al.* 1994; MEWD 2008; Siedel 2008). It is produced by rural households and consumed by 85% of low-income urban households, which rely solely on this energy source (Chidumayo 1997; GRZ 2010; Nyembe 2011). Charcoal, relatively cheap compared to electricity and petroleum-based fuels, is the preferred energy source of low-income peri-urban households (Hibajene and Kaweme 1993). Given current economic conditions and rapid urbanisation, charcoal production and consumption in Zambia are increasing (Table 6).

Increases in charcoal consumption are not limited to Zambia alone, since charcoal is also consumed in other eastern and southern African countries (Ellegård *et al.* 2001; Girard 2002; Syampungani *et al.* 2009).

Hibajene and Kalumiana (2003) indicate that 8 tonnes of wood is required for every 1.3 tonnes of charcoal produced. In Zambia, charcoal has

Table 6. Trends in charcoal production and consumption

Year	Wood (million tonnes)		
	Used	Yield	Charcoal consumption
1969	1.179	0.340	0.330
1980	2.196	0.505	0.490
1990	3.070	0.760	0.685
2000	4.056	0.933	0.905
2010	5.428	1.248	1.211

Source: Adapted from Malambo and Syampungani (2008).

¹³ See Kutsch *et al.* (2011).

Table 5. Literature search on use of charcoal in the study area

Author/s	Country	Key focus		Regional contribution			Trade			Informal trade		
		Production	Consumption	National	Regional	International	National	Regional	International	National	Regional	International
Ackello-Ogutu and Echessah (1998)	Tanzania			✓				✓				✓
Chidumayo (2001)	Zambia	✓	✓									
Chidumayo (1991a)	Zambia	✓			✓							
Chidumayo (1991b)	Zambia	✓			✓							
Chidumayo (1993a)	Zambia	✓			✓							
Chidumayo (1993b)	Zambia	✓			✓							
Chidumayo and Chidumayo (1984)	Zambia		✓			✓						
Chidumayo and Kalumiana (1991)	Zambia	✓			✓							
Chidumayo <i>et al.</i> (2002)	Zambia	✓	✓			✓						✓
Chidumayo (1997)	Zambia	✓	✓			✓						
Chidumayo (2010)	Zambia	✓			✓							
Chiwele <i>et al.</i> (1994)	Zambia		✓			✓						✓
COMACO (2010)	Zambia											
Ellegård <i>et al.</i> (2001)	Mozambique, Zambia, Tanzania	✓	✓			✓		✓				✓
Falcão (2008)	Mozambique, Malawi, Tanzania, Zambia	✓	✓			✓						✓
Girard (2002)	sub-Saharan Africa	✓	✓			✓						✓
GOM (2009)	Malawi	✓	✓									✓
GRZ (2010)	Zambia	✓				✓						
Herd (2007)	Mozambique	✓				✓						✓
Hibajene and Kalumiana (2003)	Zambia	✓				✓						
Kammen and Lew (2005)	Malawi, Zambia, Rwanda, Kenya	✓	✓									
Johnson and Rosillo-Calle (2006)	SADC					✓		✓				✓
Jubilee-Zambia Debt and Trade Desk (2008)	Zambia		✓			✓						✓
Kalinda <i>et al.</i> (2008)	Zambia	✓	✓			✓						✓
Kalumiana (1996)	Zambia	✓	✓			✓						✓

Continued on next page

Table 5. Continued

Author/s	Country	Key focus		Regional contribution			Trade			Informal trade		
		Production	Consumption	National	International	Regional	National	Regional	International	National	Regional	International
Kutsch <i>et al.</i> (2011)	Zambia	✓			✓							
Kwaschik (2008)	Mozambique, Zambia, Malawi	✓	✓		✓		✓					✓
Lesser and Moisé-Leeman (2009)	SSA						✓					✓
Malambo and Syampungani (2008)	Zambia	✓	✓									
Malimbwi <i>et al.</i> (2005)	Tanzania	✓			✓							
Malimbwi <i>et al.</i> (2007)	Tanzania	✓	✓									
Matthews and Hammond (1999)	Mozambique, Zimbabwe and Zambia	✓	✓	✓			✓					✓
Mickels-Kokwe (2005)	Zambia	✓	✓		✓		✓					
Minde and Nakhumwa (1998)	Malawi				✓		✓					✓
Ministry of Energy and Water Development (2008)	Zambia		✓		✓		✓					✓
Mulombwa (1998)	Zambia	✓	✓		✓		✓					✓
Muzvidziwa (2005)	SADC				✓							✓
Mwampamba (2007)	Tanzania	✓	✓		✓		✓					✓
Puná (2008)	Mozambique	✓			✓		✓					
Puustjarvi <i>et al.</i> (2005)	Zambia	✓	✓									
Serenje <i>et al.</i> (1994)	Zambia	✓	✓		✓		✓					✓
Sibale and Banda (2004)	Malawi	✓	✓		✓		✓					✓
Siedel (2008)	Tanzania, Mozambique, Zambia, Kenya	✓	✓		✓		✓					✓
Syampungani (2008)	Zambia	✓	✓		✓		✓					
Syampungani <i>et al.</i> (2009)	Miombo ecoregion ^a	✓	✓		✓		✓					✓
Technoshare Associates (2011)	Zambia		✓		✓		✓					✓
van Beukering <i>et al.</i> (2007)	Tanzania	✓	✓		✓		✓					✓
World Agroforestry Centre (2005)	Eastern & southern Africa	✓	✓		✓		✓					✓
Zulu (2010)	Malawi				✓		✓					✓

^a The Miombo ecoregion covers parts of Angola, Zimbabwe, Zambia, Mozambique, Malawi and Tanzania and most of the southern part of the DR Congo (Deweese *et al.* 2010) op. cit., p.2.

been identified as a key cause of deforestation; a similar conclusion was reached in Malawi (Kambewa *et al.* 2007; GRZ 2010). For the 6.08 million standard bags of charcoal produced annually in Malawi,¹⁴ an estimated 1.4 million m³ of wood is required, or about 15 000 ha of forest per annum (Kambewa *et al.* 2007). With such high demand, the CHAPOSA study '2002 Charcoal potential in southern Africa' established that charcoal production had resulted in noticeable removal of tree cover around the cities of Lusaka and Dar es Salaam over a 10-year period (Chidumayo *et al.* 2001; Ellegård *et al.* 2001). Charcoal production has in some cases resulted in total clearing of land (Girard 2002; Malimbwi *et al.* 2005). In others, charcoal producers have returned to degraded forests to remove any surviving or regrown trees for the same purpose (Hofstad *et al.* 2009).

Examples of the impacts of charcoal production vary from country to country. The deforestation rate between 1989 and 1998 for the Chongwe district in central Zambia was given as 3.3% per annum; charcoal production was identified as being responsible for about 30% of this (Chidumayo 2001). In the Nyimba district of Zambia, up to 30% of deforested land in various chiefdoms was attributed to charcoal makers (COMACO 2010). In Tanzania, charcoal production and deforestation have been blamed for the degradation of 20–25% of closed woodlands and 51% of open woodlands (Malimbwi *et al.* 2005).

Woody species used

According to charcoal producers, woody tree species for charcoal production should have a long burning time, a very high heat value and produce little smoke, sparks or ash. The most commonly used tree species for charcoal production, including fruiting and commercial timber species, are listed in Table 7 (Malimbwi *et al.* 2005; Falcão 2008).

It is not uncommon for these species to be rapidly removed from woodland once charcoal production begins, which affects the species composition of woodlands (in this case, miombo) (Chidumayo 1997; Hibajene and Kalumiana

Table 7. Tree species used for charcoal production

<i>Acacia nigrescens</i>	<i>Erythrophleum suaveolens</i>
<i>Acacia sieberana</i>	<i>Julbernadia globiflora*</i>
<i>Acacia</i> spp.	<i>Julbernadia paniculata*</i>
<i>Azelia quanzensis</i>	<i>Khaya anthotheca</i>
<i>Bauhinia thonningii*</i>	<i>Lannea schimperi</i>
<i>Boscia salicifolia</i>	<i>Lannea</i> spp.
<i>Brachystegia boehmii</i>	<i>Markhamia obtusifolia</i>
<i>Brachystegia spiciformis*</i>	<i>Millettia stuhlmannii</i>
<i>Burkea africana</i>	<i>Ozoroa obovata</i>
<i>Combretum apiculatum</i>	<i>Parinari curatellifolia*</i>
<i>Combretum fragrans</i>	<i>Pericopsis angolensis*</i>
<i>Combretum</i> spp.	<i>Pterocarpus angolensis</i>
<i>Crossopteryx febrifuga</i>	<i>Pterocarpus rotundifolius</i>
<i>Cussonia arborea</i>	<i>Schrebera trichoclada</i>
<i>Dalbergia melanoxylon</i>	<i>Sclerocarya birrea</i>
<i>Dichrostachys cinerea</i>	<i>Senna singueana *</i>
<i>Dombeya shupangae</i>	<i>Uapaca kirkiana*</i>

* = also used for firewood

Source: compiled from various authors

2003; Syampungani *et al.* 2009). Increasing demand for charcoal feedstock has led to depletion of these preferred species in Zambia, leading to use of a wider range of species; this suggests species composition of forests may be changing even further (Herd 2007). Where consumption is high, unselective harvesting has completely degraded certain forest areas, especially near urban centres (Mulombwa 1998; Malambo and Syampungani 2008; Chidumayo 2010). In Malawi, Kambewa *et al.* (2007) observed that charcoal making altered the species composition of forests and that charcoal producers were even taking food trees such as *Uapaca kirkiana* Müll.Arg. instead of the preferred *Combretum collinum* Fresen. In Tanzania, cashew nut trees (*Anacardium occidentale* L.) have also been used for charcoal production (Herd 2007); Hofstad *et al.* (2009) observed that

¹⁴ A 'standard bag' weighs 50 kg (down from 90 kg).

offcuts of preferred species are often salvaged for charcoal production. Given this approach, it is not surprising that vegetation on the plateau and escarpment areas of Malawi is transitioning into woodland dominated by an undifferentiated mixture of *Acacia* and *Combretum* species (Kambewa *et al.* 2007).

Other studies in Zambia and eastern and southern Africa suggest that, besides charcoal production, other causes of woodland loss include agriculture, infrastructure development and the spread of human settlements (Mugo and Ong 2006; ECZ 2008; Campbell *et al.* 2011). These developments are also associated with massive loss of both biodiversity and highly productive ecosystems.

Arguments against assertions that charcoaling causes woodland loss are associated with certain researchers. Stromgaard (1986) postulated that woodlands could recover after clearing for charcoal and slash and burn, as evidence suggests that miombo woodlands do recover following removal of poles for charcoal production (Chidumayo 1997; Syampungani 2008; Syampungani *et al.* 2009; Handavu *et al.* 2011). Hibajene and Kalumiana (2003) found similar results and, based on a number of assessments of the long-term viability of charcoal use, argued the regenerative capacity of miombo forests is sufficient to withstand degradation caused by charcoal production. They see deforestation of miombo from charcoal production as a temporary problem with minimal environmental impacts. Further, while in Tanzania, Malimbwi *et al.* (2005) observed that areas of open and closed woodlands disturbed by charcoal production would progressively revert back to woody vegetation once production pressure was reduced. Other studies suggest even higher levels of production in miombo woodland ecosystems once disturbances have ceased (Geldenhuys 2005; Syampungani 2008; Malambo and Syampungani 2008).

Drivers of charcoal production

The consumption of resources such as fuelwood is heavily influenced by human population numbers and growth rates. Thus population growth can be a rudimentary but effective indicator of trends in aggregate energy consumption (Mugo and Ong 2006; Falcão 2008; Siedel 2008). More specifically,

charcoal demand is driven primarily by rising numbers of urban poor, dependent on fuelwood for their cooking and heating needs (Matthews and Hammond 1999). In Zambia, the contribution of charcoal production to deforestation has been increasing steadily since independence in 1964 (Chidumayo 2010), and the growing urban population has been partly blamed. Given Zambia's 2.5% annual population growth rate and an annual urbanisation rate of 3.2%, consumption and demand for charcoal will continue to rise in the country's cities.¹⁵ Community Markets for Conservation (COMACO) correctly concludes that current levels of charcoal making are fuelling much of the observed tree destruction in Zambia (COMACO 2010). In Mozambique, Tanzania and Malawi, respective urbanisation rates of 4.0%, 4.7% and 5.3% have been observed¹⁶ and charcoal demand in these countries may trigger higher rates of production in their neighbours.

As in other parts of eastern and southern Africa, charcoal production in Mozambique is stimulated by the purchasing power of urban dwellers (Falcão 2008; Siedel 2008). In Zambia, most trucks carrying charcoal are destined for Lusaka and the Copperbelt towns, where charcoal demand has significantly increased due to frequent disruptions of electricity and other factors. For most rural households, charcoal making is a way out of poverty (Chidumayo *et al.* 2001; COMACO 2010). Rapid economic growth in many developing countries has failed to bring about such a shift for millions of people; unequal wealth distribution coupled with rapid population growth has kept demand for traditional fuelwood high (Matthews and Hammond 1999).

Charcoal production process

The charcoal production process as summarised by Hibajene and Kalumiana (2003) comprises tree felling, brushwood burning, kiln covering, wood carbonisation and access road construction, accompanied by atmospheric pollution. Charcoal production technology centres on the kiln, many types of which are in use across Africa (Foley

¹⁵ Zambia's population grew at an average annual rate of 2.8% during the 2000–2010 intercensal period (CSO 2011).

¹⁶ http://en.worldstat.info/Africa/List_of_countries_by_Rate_of_urbanization

1986). In eastern and southern Africa, the earth kiln is predominant and two types are generally used – the pit kiln and the surface earth-mound kiln (Pereira *et al.* 2001; Siedel 2008). A major problem with commonly used kilns is losses incurred during charcoal production (Mulombwa 1998; Malimbwi *et al.* 2005; Herd 2007). Efficiencies vary between kilns, which though similar in design can differ in terms of size and performance. Additionally, patterns of stacking wood in the kiln, species composition, stem size, wood moisture content, climatic conditions and level of experience of the charcoal producer will also affect efficiency (Pereira *et al.* 2001; Hibajene and Kalumiana 2003; Kammen and Law 2007; Falcão 2008). For most traditional kilns, only 35% of available wood carbon is fixed in charcoal, the rest being released into the atmosphere as smoke and non-condensed gases such as CO₂, CO, CH₄ and others (Hibajene and Kalumiana 2003; Kammen and Law 2007; Siteo 2008).

The earth kiln is the traditional technique of charcoal production in Zambia, with an estimated conversion efficiency of 12% (Hibajene and Kalumiana 2003). According to Mugo and Ong (2006), conversion factors for much of eastern and southern Africa are similar. For example, Pereira *et al.* (2001) estimated the conversion factor to be between 14% and 20% in Mozambique. The World Agroforestry Centre (ICRAF) states that only 10% of wood used in charcoal production is actually converted into charcoal (ICRAF 2005), resulting in a general consensus that charcoal production wastes a lot of wood.

With such low rates of conversion efficiency, charcoal producers in eastern and southern Africa use more wood than is necessary to produce equivalent amounts of charcoal. However, a number of modified forms of surface earth kiln with ventilation channels such as chimneys are used (e.g. the Casamance kiln), as well as stand-alone brick kilns and metal kilns now on the market. Some of the latter types can be moved from place to place, but adoption has been very slow among charcoal producers (Sepp 2008); this is perhaps due to lack of technical support and limited investments, incentives, training and policy support. It is not surprising that promotion of metal kilns by the Forest Department of Zambia has had little success with small-scale producers

(Hibajene and Kalumiana 2003; Handavu *et al.* 2011).

Charcoal producers also seldom organise themselves to take advantage of support offered by government. There is little motivation to do so since charcoaling is generally considered as complex and illegal and appears to contribute very little to the development needs of the country. In addition, some producers operate at a very small scale and are unwilling to register themselves for an undertaking that would require fees and taxes.¹⁷ About 20% of charcoal produced is lost during handling; recovery of charcoal by-products could contribute significantly to overall profitability, while helping conserve trees (Mugo and Ong 2006). For example, charcoal residue produces good-quality charcoal briquettes in Tanzania,¹⁸ but this technique has not been widely deployed elsewhere in Africa (Seidel 2008). Seboka and Mequanint (2006) showed a whole range of woody plant material suitable for charcoal production, including short-rotation exotic species such as eucalyptus, as well as sawdust and bamboo. There is a need to move away from more commonly used tree species that are becoming threatened.

2.2 Charcoal trade

Charcoal is for sale in almost all parts of Zambia (Hibajene and Kalumiana 2003; Falcão 2008; Chidumayo 2010), Malawi (Kambewa *et al.* 2007), Mozambique (Falcão 2008) and Tanzania (Malimbwi *et al.* 2005). At the national level, charcoal production contributes significantly to the respective GDPs of Zambia (3.7%), Malawi (3%) and Tanzania (2.3%) (Kambewa *et al.* 2007; Kalinda *et al.* 2008; Siedel 2008). Charcoal production also contributes significantly to household incomes (Sibale and Banda 2004; Mutamba 2007; Jumbe *et al.* 2008). In Zambia, surveys in Central, Copperbelt and Luapula provinces revealed trade in charcoal to be a major contributor to livelihoods (GRZ 1998). Additional studies such as Jumbe *et al.* (2008), Mutamba (2007) and Mickels-Kokwe (2005) reinforce these

17 A detailed discussion on this is in ILO/UNDP (2000) *Investment for Poverty Reducing Employment* ILO/UNDP Report, Lusaka.

18 See www.ecosystems-eastafrica.com/fileadmin/pdf/charcoal.pdf.

findings. The charcoal trade also offers income generation through small-scale retail businesses run mostly by women, who sell charcoal in urban areas and along road servitudes. In Mozambique, a study has shown that approximately USD 200 million per annum of charcoal is sold in urban areas, primarily for cooking (Kwaschik 2008). An estimated 92 800 people in Malawi depend on charcoal, including 46 500 producers, 12 500 bicycle transporters, 300 'other' transporters and 33 500 traders (Kambewa *et al.* 2007).

The charcoal trade also serves as a source of cash income and employment for both urban and rural dwellers. It is viewed as a source of additional income to households in much of Africa where charcoal is produced. In Zambia, as in most charcoal-producing countries, charcoal is produced in rural regions and transported to urban areas such as Lusaka through an intricate chain of traders and transporters (Mwitwa and Makano 2012; Technoshare Associates 2011). Production is widespread, presenting governments with challenges to control the practice (Girard 2002). Distribution of charcoal production in Zambia shows this activity now exists in most rural areas (Chidumayo *et al.* 2001), posing problems for monitoring and control.

In both Zambia and Malawi, demand for transportation and marketing of charcoal is high compared to cropping, and creates the most jobs in rural areas. Besides the multitudes of bicycles ferrying charcoal on Malawian and Zambian roads, large (and often old) trucks are now regularly involved in charcoal transportation (Hibajene *et al.* 1993; Mwitwa and Makano 2012). Individual charcoal producers can earn anywhere between USD 3000 and 9000 per annum (Hibajene *et al.* 1993; ICRAF 2005). It is proving so lucrative that evidence suggests better-off households and individuals also derive their livelihood from charcoal, including large-scale producers, wholesalers and large-scale retailers. Rent-seeking by public officials also suggests the charcoal business is an important economic activity; private taxation of charcoal traders diverts an estimated Malawi Kwacha (MKW) 1 billion per annum from government coffers (Kambewa *et al.* 2007).

The regional charcoal trade is largely controlled by bilateral agreements between countries, but the dominant instrument is the SADC Trade Protocol

of 25 January 2000. The protocol aims to liberalise regional trade by 2012, although as of 2008 only 80% had been liberalised. Goods covered by this protocol fall into three categories, none of which include charcoal and timber. The COMESA Simplified Trade Regime (STR) has provided another umbrella under which trade can be undertaken (DPC and Associates 2010). According to Zambia's Ministry of Commerce, Trade and Industry (MCTI), the STR aims to promote small-scale trading among COMESA member states. Charcoal is not among the 17 trade categories with respective products and harmonised system codes; it remains outside normalised cross-border trade.

In Zambia, the ZDA provides a comprehensive analysis of trade in wood and wood products. However, it does not include round wood and charcoal, perhaps for reasons of conformity with Statutory Instrument 7 of 1997 (GRZ 1997). Both COMESA and SADC provide frameworks through which member countries can negotiate bilateral trade agreements. Charcoal may be included in negotiations depending on the understanding of cross-border demand for charcoal, but current signals indicate this is unlikely to happen. Zambia does not have bilateral agreements with any of its eight neighbours, although there is a draft agreement with Mozambique. Discussions with Malawi on a bilateral agreement were suspended. Zambia's trading with Malawi and Zimbabwe is conducted under the COMESA trading agreement. However, in 2011, Zimbabwe and Zambia's Joint Permanent Commission of Co-operation (JPCC) resolved to develop a bilateral trade agreement between the two countries (The Services Group 2007). A move to establish a Zambia–Malawi–Mozambique Growth Triangle (ZMM-GT) to promote trade and economic growth has not materialised.¹⁹ Unless new agreements acknowledge that charcoal is moving across borders, it will continue to be traded informally in the future.

The majority of papers addressing this issue appear to infer that most trade is informal, an observation also noted in the SADC Forestry Strategy (SADC 2010). At the regional trade level, documentation seems to paint a picture of informal movement of charcoal unwittingly promoted by nationally based

19 See: http://www.uneca.org/eca_resources/Press_Releases/2011_pressreleases/pressrelease11011.html.

Table 8. Informal charcoal and timber cross-border exports out of Tanzania 1995–1996

Country	Exports (USD thousands)	Imports (USD thousands)
DRC	33	-
Kenya	47	8
Malawi	-	5
Zambia	-	1

Source: Ackello-Ogutu and Echessah (1998)

restrictions on its movement. With the exception of Sibale and Banda (2004), who mention the existence of barter involving charcoal between Mozambique and Malawi, most papers only infer such markets. Similarly, studies focused on regional trade (Johnson and Rosario-Calle 2006; Siedel 2008; Lesser and Moise-Leeman 2009) recognise that charcoal forms part of regional markets but present no figures. A series of papers covering trade within and between Malawi (Minde and Nakhumwa 1998) and Tanzania (Ackello-Ogutu and Echessah 1998) suggest that charcoal is a significant component of cross-border trade. While the values of exports from Tanzania to Malawi and Zambia are not given, we show later there are significantly active borderposts between these countries. Ackello-Ogutu and Echessah (1998) indicate informal trade between Tanzania and neighbouring countries where forest products (including charcoal and timber) are some of the commodities identified.

The SADC Forestry Strategy makes strong reference to ‘inadequate formal trade’ promoting informal cross-border trade (ICBT) in forest products (NTFPs included). The destinations of these products go unreported, often costing member states huge amounts of lost revenue (SADC 2010), although SADC’s Regional Indicative Strategic Development Plan (RISDP) acknowledges ICBT (SADC 2003). According to Umnotho WaMazwe (2008), ICBT is driven by a diverse group of people dominated by women, orphans, refugees, youth, school leavers and widows, most of whom are generally vulnerable and not otherwise gainfully unemployed. The ICBT is increasingly an important economic sector in the SADC region, given its potential contribution to poverty alleviation, employment creation and economic growth. According to Musonda (2004), informal trade within SADC

contributes on average more than USD 17.6 billion per year to national economies. Cross-border traders are confronted with hostile policy environments at both national and regional levels, thus undermining their ability to combat poverty.

On the ICBT highway, anything (including charcoal) can be moved. Players have been organising, while countries such as Malawi, Mozambique, Zimbabwe and Zambia have established national cross-border associations that are now seeking alliances and networks, strengthening coordination and increasing communication between and among each other.²⁰ In a way, they are trying to formalise the informal. Better knowledge of what the SADC trade protocol and the COMESA simplified trade tariffs offer would surely put ICBT on a stronger footing. As long as regional trade in high-demand goods such as charcoal remains largely informal due to national controls, cross-border traders will profit.

2.3 Regional forest management policy frameworks

The SADC forestry strategy calls for laws and policies to be more complementary, harmonising controls on illegal logging and trade in forest products (SADC 2010). Using Malawi, Tanzania and Zambia as examples, we examined how existing national policies on forestry, energy and environment (Malawi 1996, Tanzania 1998 and Zambia 1998) address the shared issues of the charcoal and timber trade. We looked at these policies against a backdrop of increasing demand for sustainable forest management and, more recently, sustainable charcoal production. The activities of the three countries in the forestry sector are guided by national forest policies (NFPs), with subsidiary regulations aimed at putting them into effect. A review of these policies shows they do make a link between charcoal production and deforestation, with calls for action under the rubric of sustainable forest management (SFM).

The concept of SFM, which has gained momentum in much of southern and eastern

20 Associations in place are: Cross Border Traders Association of Malawi, and The Informal Economy Union of Malawi; Zimbabwe Cross Borders Association; MUKERO (Mozambique); Zambian Cross Border Traders Association.

Africa, is reflected in national policies and most subsidiary legislation. For example, the forest Acts of Malawi (GOM 1997) and Tanzania (MNRT 2002) are explicit about SFM, but that of Zambia, promulgated in 1973, is not. The Zambian situation presents a paradox where the Forestry Policy of 1998 is driven by an older act, despite a large number of amendments and statutory instruments designed to address emerging issues in the sector. In all cases, each of these Acts provides regulations that govern extraction, harvesting and use of forest products, e.g. 'Part VIII - Utilisation of Forest Produce in Forest Reserves and Customary Land' (GOM 1997).

There are also separate regulations linked to licensing, which often require management plans to be developed for activities such as logging. Such provisions often cover both timber and NTFPs. Under Article 81 of the Malawi Forestry Act (1997), charcoal production from indigenous trees is illegal unless it can be shown to have been produced from a sustainably managed forest; an approved management plan must exist, and an application for a production licence must be received (GOM 2009). The extent to which sustainable charcoal production is included in the forest policy and subsidiary legislation is unclear, but presumably broad SFM initiatives can address it.

Charcoal is one of the primary energy sources for these three countries. As such, charcoal is reflected in their energy policies. While there is a trend towards more modern energy sources such as electricity, the central issue of energy from biomass is not addressed. Malawi's Energy Policy of 2003 calls for more controls on charcoal production, while that of Tanzania (2003) calls for improved charcoal production (i.e. better kilns). That of Zambia (MWED 1995 and 2008), while echoing the other two points, focuses on increased production efficiency, as well as adoption of fuel-efficient stoves. Positive contributions through existing energy policies are further supported by various environmental policies. Environmental policies in Zambia's neighbours recognise the need to address issues pertaining to charcoal production and woodland loss (GOM 1996; URT 1998; GRZ 2007), with policies generally calling for sustainable forest management and charcoal production.

Regional governments have formulated forestry programmes to address deforestation. In Tanzania's national forestry programme (URT 2001), Malawi's national forest programme (GOM 2001) and Zambia's Forest Action Plan (1998), a common desire to address issues pertaining to forest loss is evident. In most cases, these countries' special programmes are closely linked to their national development plans. These plans can be viewed as worthy attempts to harmonise various policies that address charcoal production and timber trade, but such programmes are largely limited to the forestry sector. The failure to harmonise provisions in these policies means that issues pertaining to charcoal remain fragmented and may never be addressed effectively.

In addition to these policy frameworks, there are a number of controls on charcoal production and trade. Before the 1990s, charcoal production in Zambia was effectively regulated by the Forest Department. Production areas were properly managed to promote natural regeneration; some woodland areas in the Copperbelt were completely regenerated and re-harvested over rotational periods of 20–25 years. However, the regulation of charcoal production declined in the 1990s. Since then, it has become almost non-existent other than for irregular issuance of charcoal production and conveyance permits. Similarly, in Malawi, efforts to protect forests are failing as epitomised by ongoing unsustainable charcoal production. Kambewa *et al.* (2007) report that, in all areas, visited traditional leaders were aware of unlicensed charcoal production in their areas, but either participated in or ignored the activity. A survey in northern Zambia established that charcoal was sold door-to-door because most of the product was obtained illegally (Mulombwa 1998).

2.4 Foreign direct investment and local land losses

This study does not address foreign direct investment (FDI), but it is important to look briefly at its impact on charcoal and timber production. FDI is often viewed as a trigger for economic development, employment, modernisation and growth. In Zambia, Vision 2030 calls for a 'prosperous middle income nation by the Year 2030'; this vision can only

be realised by diversifying the economy through bolstering activities in agriculture, tourism and manufacturing (MoFNP 2006), and through land investments in mining, agriculture, conservation and forest concessions. ZDA (2011) reported FDI of just under USD 94 million and the acquisition of at least 398 000 ha for large-scale agriculture; the government itself had identified 1.3 million ha of land for cultivation of biofuels, cotton and food crops (GRZ 2011). As the country moves towards greater involvement with private capital, concerns emerge as to the extent to which local people may be displaced (Bose *et al.* 2003), associated environmental impacts and how former common property resources might be handled (Douthwaite *et al.* 2005).

Of concern here is the alienation of land from the customary to the commercial realm (Gumbo and Mudenda 2009). For example, the districts of Chinsali and Nakonde will lose 134 000 and 98 212 ha, respectively (GRZ 2009). While new landowners can theoretically harvest both charcoal and timber, the former may only be undertaken as part of land clearing and charcoal must be used in the home; if the intention is to sell the charcoal, a production licence and conveyance certificate will be required. The situation is different for timber; according to the Lands Act of 1995, forests are vested in the president (GRZ 1995) and new landowners must obtain concession licences to benefit from them.

The bigger issues lie with potential land losses and pressure on remaining land. As noted in Table 3, Chinsali district will lose about 8.7% of its land, while Nakonde will lose 21.2%. Nakonde district already has a population density of 25.5 persons/km² yet still has some timber and customary land for harvesting *finkubala* (edible caterpillars) and charcoal production. In addition to loss of resource-harvesting areas and displacement of people, the pressure on woodlands and forest for charcoal production is huge. In Nakonde, where pressure is likely to be greater, a highway aids the movement of charcoal to the border town of Nakonde and beyond. Reducing the area under charcoal production against a backdrop of increasing charcoal production will lead to intensified production in limited areas, leaving little or no room for regeneration.

2.5 The legal and forest policy framework in Zambia

Production and trade of charcoal and timber in Zambia involve a diverse range of actors whose involvement is guided by the national forestry policy and legal regulations. In this scoping study, policy is viewed as the interplay of discourse, political interests and the agency of multiple actors in the forestry sector. The commercial use of forest products (in this case charcoal and timber) is complex; it involves institutional relationships and structural constraints, as well as opportunities for agency, action and change (Long 1992). This offers a different perspective on natural resource management policies. In the case of Zambia, forest policy is viewed as constituting decisions by those with responsibility for policy, in this case the FD. In this way, policy decisions can be delivered in the form of broad statements, formal positions and/or strategies on an issue with no room for deliberations on outcomes, including implementation plans. Top-down decision-oriented policy outlooks – which deny the existence of different relationships within and among state authorities, bureaucrats and broader society – define the forestry sector in Zambia. Such outlooks often promote easily entrenched monopolistic and centralist tendencies. The use of forest products in Zambia falls under the FD, but experience shows that relationships between forest managers and stakeholders such as forest product user groups and political authorities affect policy implementation (Burchell *et al.* 1991).

There are increasing calls for more implementation-oriented policy perspectives. These would allow for negotiation and bargaining within and among different national actors, leading to more effective and rewarding arrangements (Hill 1997). The Zambia Forest Policy (1998) promotes sustainable forest resources management through conservation, protection and use of forest resources, as well as increased participation of local communities (GRZ 1998). Local people use forest resources such as charcoal and timber, and increasingly view them as a means of creating income. The participation of marginalised people and groups such as charcoal producers and pit sawyers in extraction and utilisation processes would help include the informal sector in policy formulation, a step many formal institutions

often gloss over or are unaware of (Held 1996). Zambia's forest policy, legal frameworks and formal institutions discussed in this report include enabling laws and regulations governing the use of and access to forest resources. Informal institutions include conventions of resource users, e.g. pit sawyers, and the views of politicians and society towards their roles (James 1999). This thinking has not influenced the development of forest policy in Zambia.

Zambia's forest policy dates back to the colonial demarcation of local and national forestry reserves in the 1940s. Focusing on commercial production of timber and charcoal, they omitted open areas (comprising 66.4% of forests) falling under customary law. These open areas not only contain high-value timber, but are also important sources of charcoal. Over the years, policy reviews acknowledged the growing dependence on charcoal as a major energy source and its impact on the environment. Research was also promoted to establish better methods of producing charcoal. From the 1960s to the late 1990s, the FD implemented sustainable charcoal production through the coupe system,²¹ but changes in institutional structure and lack of policy support led to failure of research trials on controlled charcoal production. This was followed by rampant uncontrolled charcoal production in undesignated areas, resulting in serious forest loss. To minimise such losses, the 1998 Forest Policy provided for the development and implementation of sustainable extraction and use of fuelwood; the policy sought to improve the efficiency of technologies and to encourage the use of alternative energy sources, as well as plantation species in charcoal production.

The 2007 revision of the 1995 Energy Policy recognised charcoal as an alternative to other energy sources such as electricity and gas; it also looked at household consumption within the context of the national energy mix (MEWD 2008). This policy called for less charcoal dependence by promoting rural electrification. It also provided for effective regulation of the fuelwood sector through continuous monitoring of the charcoal industry, focusing on price, trends, production and consumption levels (GRZ 2007). Other

provisions included training charcoal producers and better organisation and management of charcoal production through more efficient kilns and development of fuel-efficient stoves. These measures have been deployed in a segmented manner rather than through the harmonised approach suggested by the national policy on environment; this has affected their impact.

From the 1940s through early independence to the present, Zambian forestry policy has been centralised, focusing on licensing the removal and trade of forest products; Forest Act No. 39 of 1973 mandates forest officers to collect revenue from the production and conveyance of forest produce, among them charcoal and timber. At the district level, forest officers implement the forest law through the issuance of two types of licences (for production and for conveyance of charcoal and/or timber). This approach is considered to be the most effective way of preventing deforestation and forest degradation, while contributing to national revenue collection. Over the past 15 years, production fees for both charcoal and timber have steadily increased. For example, between 1995 and 2011, charcoal production fees per cord (3 m³ of cut wood) increased from ZMK 3000 to ZMK 108 000. Over the same period, conveyance fees soared from ZMK 200 to ZMK 5400 per standard bag of charcoal.²² There were similar changes in terms of timber.

As a result of these drastic changes in fees, many traders simply do not pay them, preferring to 'negotiate' their way to market. More significantly, the role of forest officers revolves around managing roadblocks and conducting highway patrols, where they collect fees from traders and confiscate illegal charcoal and timber. In this instance, licensing has ceased to perform its control function and has instead become a way for the FD to collect revenue. In Zambia, as in other African countries, this practice has promoted rent-seeking behaviour among bureaucrats; at the same time, it has largely excluded rural communities from benefiting from forest products as they once enjoyed under Joint Forest Management (JFM) (Bwalya 2007).

21 The coupe system identified charcoal production areas where cycles of charcoal production followed the regeneration capacity of harvested areas. The objective was to sustain both production and resource availability.

22 Outlined on http://www.mtenr.gov.zm/index.php?option=com_content&view=article&id=100&Itemid=78 (24 April 2013).

External control is exerted through timber export policy, rules and regulations, which ban the export of charcoal and round wood (GRZ 1996). While charcoal and timber are listed in the Customs and Excise Act No. 5 of 2007, the commodities are not valued in terms of taxation; this promotes informal trading, resulting in customs officers relying on the discretion of forest officers to allow consignments of charcoal to be taken out of Zambia for domestic use. While records of timber exports can be easily obtained from the ZRA, records of charcoal exports are scant.

In summary, by bridging the sections on methods and background information and fieldwork outcomes, this section contributes towards building a case for the production of charcoal and timber. It provides useful but generalised information on the forestry sector in Zambia and neighbouring countries. The following issues can be identified:

1. Charcoal production is an important energy source throughout Zambia and its neighbours, but the extent of production may vary and requires further assessment.
2. There is uniform acceptance that charcoaling has serious impacts on forests, but no policies in place to address this problem.
3. There are startling similarities between Zambia and its neighbours in terms of legal and policy frameworks governing the forestry sector, but the extent to which experiences have been shared is unclear.
4. The literature clearly indicates that charcoal production (and less so timber production) is harmful to forests in all charcoal-producing countries such as Malawi, Tanzania and Mozambique.
5. Trade in timber is largely formalised in all neighbouring countries, but trade in charcoal is not. The literature from neighbouring countries indicates the presence of national markets and infers there are cross-border markets for charcoal. Charcoal is, however, moved across borders by haulage trucks and other means.
6. Existing trade agreements are largely under the umbrella of SADC and COMESA. Neither recognises charcoal as a trade commodity, thereby pushing it towards the informal sector. Informal cross-border trading appears to be increasing and national associations have been formed to manage the trade.
7. Unfortunately, the research team was unable to access adequate information. Records were not made available and most available papers covered charcoal production, with very little information on its socio-economic aspects.

3 Charcoal production and trade

Scoping studies are increasingly incorporating interviews and focus group discussions obtained during the data gathering process (Levac *et al.* 2010). This section presents information provided by charcoal and timber producers, as well as other stakeholders encountered along the value chain. When it overlaps with information above, it is appropriately acknowledged.

Prior to presenting the major findings, two major issues need to be highlighted. First, there are 5 provinces, 10 districts, and 6 border-crossing points, the names of which are mentioned several times hereafter. To reduce repetition, the name of each district or town will be retained, linked with the first letter of the relevant province (Table 9).

Second, understanding charcoal production and trade in Zambia is dependent on understanding the packaging and weight system used in the markets. Charcoal is sold in labelled bags ranging from 10 to 50 kg. Bags labelled 70 kg and 90 kg are referred to as ‘wholesale bags’.²³ Smaller charcoal bags are largely recycled synthetic bags formerly used for maize meal, cement or flour, as well as paper bags. The size of the bag does not necessarily represent the weight of the charcoal it contains; in some markets, the average weight of bagged charcoal in a 50 kg bag was 33 kg; a 25 kg bag weighed 22.5 kg, and a 10 kg bag with a ‘head’ weighed 18 kg; the ‘head’ of the charcoal usually rises about 30 cm above the rim of the plastic bag.

Charcoal producers point out that weights also vary according to the species of tree used. *Brachystegia* and *Julbernardia* spp. charcoal weighs much less than *Colophospermum mopane* Kirk ex

Table 9. Abbreviations for districts and border towns in the study area

Province/Site	Type	Nomenclature
Copperbelt		
Chililabombwe	District	Chililabombwe (C)
Kasumbalesa	Border-crossing point	Kasumbalesa (C)
Eastern		
Chipata	Border town – also linked to Mwami	Chipata (E)
Katete	District	Katete (E)
Mwami	Border-crossing point	Mwami (E)
Nyimba	District	Nyimba (E)
Uchimi	Border-crossing point	Uchimi (E)
Northern^a		
Chinsali	District	Chinsali (N)
Nakonde	Border town and District	Nakonde (N)
Northwestern		
Jimbe	Border-crossing point	Jimbe
Kasempa	District	Kasempa (NW)
Mwinilunga	District	Mwinilunga (NW)
Southern		
Chirundu	Border town	Chirundu (S)
Kazungula	Border-crossing point	Kazungula (S)

Source: Authors

a Although now known as Muchinga province, it is referred to as Northern province in this report.

²³ Originally used to store and transport second-hand clothes.



Figure 5. A typical 50 kg bag of charcoal



Figure 6. A 50 kg bag of charcoal with a 30 cm head

J.Léon, which is used in Southern province and some parts of Eastern province. Charcoal producers in Kamukuwe village in Chief Mushabva's area thought that *Piliostigma thonningii* Milne-Redh would produce heavier charcoal than the average miombo tree species. The 'head' of the charcoal, and the manner in which it is constructed and secured, is a form of value added. In some cases, supports with webbing made from bark fibre and stems of *Grewia monticola* Sond. are used, while

other areas such as Northwestern province also use grass.

3.1 The charcoal production cycle

The charcoal production cycle as described by producers is similar to that described by Hibajene and Kalumiana (2003). In the first stage, a production site close to roads and market places is identified, where preferred tree species of suitable diameter classes exist (Chidumayo 1997; Malimbwi *et al.* 2005; Herd 2007; Syampungani 2008). The next stage is the preparation of stems and trunks for kilning, which involves cutting down whole trees and de-branching and/or crosscutting selected trunks and branches. Lastly, a typical kilning process includes construction of a kiln base; bigger logs are covered with smaller, stem-sized logs facing the same direction (Figure 8) and then finally covered by stems of an even smaller diameter, grass and mud.



Figure 7. A burning earth kiln in Nyimba district

Kiln sizes vary, but one found under construction on the Nyimba-Chipata road measured 4.5 m long by 2.3 m wide and 1.3 m high, requiring 13.5 m³ of cordwood to construct (Figure 7). The kiln had a base of medium-sized logs with a layer of bigger logs up to 30 cm in diameter stacked on top of the bedding.



Figure 8. Kiln under construction on land cleared for cultivation in Nyimba district

They were building the kiln on a site about 1 ha in area that was being cleared for agricultural purposes.²⁴

Charcoal producers indicated it was important to monitor a kiln frequently to ensure the fire does not go out and there is no form of kiln collapse. Final activities include unpacking the kiln, cooling and bagging the charcoal, and finally transporting it to market (Hibajene and Kalumiana 2003; Herd 2007). Different types of packaging are used, but usually synthetic bags are tied with fibre and twigs. Charcoal is transported from the field to markets, homesteads or to redistribution points by a variety of methods, either as head loads, in wheelbarrows, ox-carts, bicycles, sledges and trucks (both open or containerised) of different capacities.

3.2 Production areas

All of the study districts produce charcoal, most of which is from both customary areas (chiefdoms) and forestry reserves (see Table 10). In certain districts, some forestry reserves have been so heavily encroached that moves have been made to degazette them (Hasungule *et al.* 1998; Palmer 2001). In Chinsali (N), the Ituntwe Forest

Reserve was reported as being severely impacted and a potential candidate for degazetting. Similar sentiments were expressed about Sishimba Forest Reserve in Nyimba (E) district. Almost all districts indicated the bulk of their charcoal was from customary lands, which was confirmed by some of the chiefs attending district validation meetings. This is not surprising: most of the study districts, apart from Nyimba where 40% of the district falls within the West Petauke Game Management Area (GMA), are predominantly under chiefdoms and all villages in Table 10 producing charcoal fall under this category of tenure.

There are a few reports of the involvement of private farms from Katete (E) and Nyimba (E), indicating that traders routinely bought either charcoal or trees for charcoal production from such areas. In a bid to meet increasing charcoal demand, production is no longer a dry season activity, contrary to what is presented in much of the literature. Wet season volumes were noted as generally lower than those of the dry season. However, the dry season was preferred because it most often coincides with land preparation for crop production — timber from clear-felled fields also being used to produce charcoal. Such activities usually take place between August and November, but can vary by area. During this period, the number of charcoal producers increases sharply as opportunistic producers get involved. Charcoal produced under such arrangements is not subject to a production licence and, as shall be seen later, this is the peak period for charcoal production.

²⁴ The site was located about 165 km from Chipata on the Chipata to Lusaka road. On a later visit, it was observed that no crops had been planted on the site and that perhaps the farmer had used this as an excuse to make charcoal. During the district consultative meetings in Nyimba, the pending degazetting of Sishimba Forest Reserve was highlighted.



Figure 9. Site of a former kiln, showing limited tree regeneration

The supply of charcoal to the study districts is not limited to areas identified in Table 10, but also to adjacent districts. No distinction was made at this stage of the study to determine charcoal volumes from these additional sources. As was shown in the district validation meetings, some of the receiving districts [notably Nakonde (N), Katete (E), Nyimba (E) and Chipata (E)] act as staging posts in addition to receiving charcoal from other

districts, thereby facilitating movement of charcoal to markets beyond the country's borders.

Almost all charcoal producers encountered during this study acknowledged the process was leading to woodland loss and occasional wildfires. Interestingly, producers in Chinsali (N), Kasempa (NW), Katete (E) and Nyimba (E) observed that trees in former charcoaling areas will recover if left undisturbed. They noted that such areas are either candidate sources of timber for brick-making, or become cropping areas. There was consensus that tree regeneration is close to impossible where actual kilns were sited, but some charcoal producers use such areas to grow pumpkins.

There are claims and counter-claims on the impacts of charcoal production. According to COMACO (2010), extensive parts of Nyimba (E) district have witnessed substantial tree removal for charcoal production. However, some districts under study (including Nyimba) indicated some villages have produced charcoal for longer than 10 years. Among such areas are Kansono, Kacholola, and Muchimazi in Nyimba (E), and Kagoro, Cholowa and Mpangwe in Katete (E). While emphasis has been on general forest loss, Nakonde (N) highlighted that a district is considered 'deforested' when it no longer has trees with stem diameters to allow commercial charcoal production.

Table 10. Sources of charcoal entering the study districts

District	Villages	Chiefdoms	Other districts	State land
Nyimba	Kazolwe, Kimono, Atlas, Kacholola, Muchimazi resettlement scheme	Ndake, Nyalungwe	None	
Chinsali	Along the Great North Road in Chinkumba, Chifunsa, Yosamu, Chimbele, Chewe, Kapumpa, Kampimpa, Ilondola Mission and Musanya	Chewe, Nkula, Chinkumba	None, but export to others	Ituntwe Forest Reserve (degraded, almost depleted)
Katete	Cholowa, Chimwa/Ntaya, Malata. Mbangómbe, Kulanga, Kayanza, Songwe, Kayima, Kampambe farms, Mzime, Undi area, private land	Mbang'ombe (women involved as well), Kawaza	None, but export to others	Chimtengo forest
Nakonde	Nakakola, Chitambi, Sasamwenge, Kalungu, Nachitemi, Kasambamulopa, Chikokwa, Muyombe Road	Waitwika	Isoka	Yes, but need to verify forest reserve that is getting degraded
Kasempa	Kamalamba, Kamusangolo, Kansono, Kangómbe	Chief's Capital		Kamono local forest

Source: Current study

3.3 Species used in charcoal production

Yet another dimension of tree loss related to charcoal production centres on preferences for specific tree species. While almost all trees can be used for charcoal production, Table 11 shows those most in demand by charcoal producers (Chidumayo 1997; Kambewa *et al.* 2007; Syampungani 2008). Preferred species must produce long-lasting embers that emit a lot of heat. This study established that producers are choosing less preferred species because preferred ones are relatively scarce. This level of deforestation results in producers turning to traditionally protected species such as fruit and medicinal trees, or exotic fruit trees such as mango (*Mangifera indica* L.). In the districts under study, the following species were identified as being preferred for charcoal production (Table 11).

Species identified as important to charcoal production are all part of the miombo ecosystem, dominated by trees of the genera *Brachystegia*, *Julbernardia* and *Isobertinia* (Malaisse 1978; Dewees *et al.* 2011). These trees also appear in the literature on charcoal production in other countries in eastern and southern Africa. Miombo trees are known for their capability to coppice, and with improved management can re-establish themselves within relatively short periods (Chidumayo 1997; Kalumiana and Shakacite 2003); this is the basis for asserting that charcoal production in miombo can be sustainable (Chidumayo *et al.* 2001; Malimbwi *et al.* 2007; Syampungani 2008). Interviewees also recognised the ability of miombo species to coppice and regenerate.

3.4 Production trends

Respondents indicated increased charcoal production in their respective districts, linked to an elaborate system of roadside markets drawing charcoal from source areas as far as 20–30 km distant. Charcoal producers noted that preferred species were gradually depleted from roadsides, outwards into the forests. The overall trend suggests that roadside woodlands have been depleted due to their easy accessibility (Malimbwi *et al.* 2007). Further, as noted by discussion participants in selected districts and border towns,

there are signs of new trends affecting charcoal production, including the following:

- a. Increases in total area under charcoal production; charcoal is now produced practically wherever suitable trees occur, including stream banks and hillsides. In some areas [e.g. Chief Mpezeni's kingdom in Chipata (E) and Mpangwe hills in Katete (E)], hillsides have been completely cleared of tree cover. While there is no direct linkage between siltation of surface water bodies in these areas and loss of tree cover, it can be argued that charcoal is indeed having an indirect effect.
- b. Since charcoal is widely produced, there are more producers than before, with varying levels of skills in kiln making; this raises questions about production efficiency. It is possible that more trees are being cut to produce less charcoal, with final production figures increasing due to the existence of more producers.
- c. Severe charcoal feedstock shortages are felt in a number of places such as Eastern province, and less-preferred species and indigenous fruit trees such as *Uapaca kirkiana* Müll. Arg. and *Piliostigma thonningii* are more often used to produce charcoal.
- d. Increasing demand for charcoal in urban centres, where power utilities such the Zambia Electricity Supply Corporation (ZESCO) are failing to cope.
- e. Women are increasingly involved in charcoal production rather than retail; this is in stark contrast with the literature, which portrays charcoal production as male-dominated with women involved in packaging and selling (Seidel 2008).

Product inflows into selected districts and urban market places reveal changes affecting production dynamics such as variations in local seasons. Field-based researchers reported changes in seasonal charcoal inflows into districts and town centres between January 2010 and December 2011; higher inflows were observed into various non-border districts such as Kasempa (NW), Katete (E) and Nyimba (E) between April and September (the start of the dry season). In Northern province, the peak is between October and March, whereas in Kazungula (S) and Chililabombwe (C) peak inflows are in January and May to October,

Table 11. Trees used for charcoal production

District	Names of species used for charcoal production	
	Local	Scientific
Eastern province		
Katete	Gonondo	<i>Terminalia sericea, T. stuhlmanni</i>
	Kasokosoko	<i>Stereospermum sp.</i>
	Mfundaluzi	<i>Brachystegia boehmii</i>
	Msolo	<i>Pseudolachnostylis maprouneifolia</i>
	Mubanga	<i>Pericopsis angolensis</i>
	Musambanfumu	-
	Musangu	<i>Acacia faidherbia</i>
	Musekesi	<i>Piliostigma thonningii</i>
	Nfungo	<i>Anisophyllea boehmii</i>
	Mtowa	<i>Diplorhynchus condylocarpon</i>
Nyimba	Kalama	<i>Combretum collinum</i>
	Msekese	<i>Piliostigma thonningii</i>
	Mubanga	<i>Pericopsis angolensis</i>
	Mutondo	<i>Julbernardia paniculata</i>
	Muweti	<i>Terminalia stenostachya</i>
	Mwazamasaka	<i>Brachystegia bussei</i>
Northern province		
Chinsali	Ngalati	<i>Pseudolachnostylis maprouneifolia</i>
	Mutondo	<i>Julbernardia paniculata</i>
	Mpasa	<i>Maprounea africana</i>
	Musamba	<i>Brachystegia longifolia</i>
	Mubanga	<i>Pericopsis angolensis</i>
	Muputu	<i>Brachystegia spiciformis</i>
	Mutobo	<i>Anisophyllea boehmii</i>
	Mutondo	<i>Julbernardia paniculata</i>
	Kamponi	<i>Julbernardia globiflora</i>
Nakonde	Mseza	<i>Cassia abbreviata</i>
	Mtete	<i>Acacia gerrardii</i>
	Mbangozi	<i>Azelia quanzenis</i>
	Nkalalama	<i>Combretum spp.</i>
	Musekesi	<i>Piliostigma thonningii</i>
Northwestern province		
Kasempa	Musamba	<i>Brachystegia longifolia</i>
	Mutobo	<i>Anisophyllea boehmii</i>
	Mutondo	<i>Julbernardia paniculata</i>

Source: Current study

respectively. The reasons for these changes are similar for districts and border towns and include cold weather, low production associated with the rainy season, power interruptions, energy type and ease of indoor use.

Other factors affecting inflow are the impacts of the farming and festive seasons, as well as school opening times and the start of a new year. In the rainy season (October/November to March/April), there is greater focus on crop cultivation and less on charcoal production; during this period, charcoal may become scarce, resulting in higher urban demand. In the cool dry season (May to July), there is high urban demand for charcoal for cooking and heating, often coinciding with reduced agricultural activity.

3.5 Movement of charcoal to border towns and beyond

Fears that Zambian charcoal might be moving out of the country warrant further investigation. Observations indicate that charcoal moved to border-crossing points may also be taken legally or illegally across the border and beyond. Examples include the border-crossing points of Mwami (E) to Mchinji in Malawi; Chirundu (S) to Chirundu in Zimbabwe; Katete (E) Ukwimi border-crossing point to Mozambique; Chililabombwe (C) to Kasumbalesa crossing point into the DRC; Kazungula (S) into Botswana; and Nakonde (N) into Tunduma in Tanzania.

The most easily noted movement of charcoal across borders usually takes the form of one to three 50 kg bags of charcoal on haulage trucks and other motorised vehicles. Most travellers claim that such charcoal is for home use, and there is no legal control for this. District validation meetings in Katete (E) and Nakonde (N) confirmed that local people from communities along the border can cross at will, and when so doing may move charcoal as well. District validation meetings in Nakonde (N) and Chinsali (N) reported that people from villages in neighbouring Tanzania were entering Zambia to make charcoal. A similar observation was made in Kasumbalesa (C). People living closer to official crossing points can cross the border into Malawi, Zambia or Mozambique on day passes and travel as far as 20 km inland (Dhlodhlo 2002). In addition, informal cross-border traders also move charcoal and often spend

up to a week on a trip (Minde and Nkhuwa 1998). There appear to be no restrictions on the number of times an individual may cross the border with charcoal in a given month. As the law is unclear on the movement of charcoal for domestic use, border control officers must often use their own discretion as to how many bags a traveller can take across.

Forestry Officers at the Kazungula (S) border crossing indicated they regularly confiscate charcoal bags from individuals if more than three bags are found on a truck with a single occupant; such bags are disposed of through normal legal channels.²⁵ At the Chirundu (S) border post, where an average of 225 haulage trucks cross every day (Curtis 2009), there is some confiscation of charcoal bags. However, bags are still found on the 'water highway' across the Zambezi river where canoes are used to transport illegal goods. In Zimbabwe, a participant observed that charcoal is openly traded in the towns of Karoi and Chinhoyi. According to vendors in Karoi, most of this charcoal enters from Zambia through the Chirundu border post. Also observed at Chirundu on the Zimbabwean side were confiscated bags of charcoal; brief discussions indicated they were confiscated because the travellers had exceeded their monthly duty rebate (about USD 300).

There are interesting situations at the Chililabombwe (C) and Nakonde (N) border posts with regard to cross-border charcoal movements. In Nakonde (N), with its extensive 'no-man's land', controlling movement of goods is often very difficult; it has become a favoured area for illegal cross-border movement of charcoal. The porous border between Tanzania and Zambia also means there are numerous unofficial crossing points through which local people are able to move charcoal. Outsiders from neighbouring districts and the DRC enter Chililabombwe (C) to produce charcoal and to sell it in that country, creating cross-border conflicts exacerbated by numerous uncontrolled border-crossing points. A general Memorandum of Understanding (MoU) is expected, which would attempt to control the movement of goods, including charcoal, across borders.

²⁵ The FD will seek a court order to dispose of such charcoal through a public auction.

Table 12. Do producers obtain permission to make charcoal?

Border	Permission obtained?		Comments
	Yes	No	
Chipata	X	X	There are more people with licences than without.
Kazungula	X	X	Some obtain permits from the Forest Department, while others do not. There are more who get them than those who do not.
Chirundu	X	X	There are more producers who do not obtain permits than those who do. As a result, producers move a lot of illegal charcoal at night to avoid being apprehended.
Katete	X	X	Very few producers get permission; many routes for charcoal movement.
Chililabombwe	X	X	There may be more illegal than legal activities.
Nakonde		X	Mostly illegal.
Chinsali		X	Mostly illegal.
Kasempa	X	X	Mixed.
Nyimba		X	Mostly illegal. The FD focuses on confiscations and does not check on operations. The district is vast, with too many possible routes for charcoal.

Source: Data from current study



Figure 10. kaLicensi Kalipo (licence is available) - talking to a charcoal producer-retailer on the Chipata-Lundazi road

The Mwami (E) border post is in an area where tribal affinities are shared across the border; the people fall under paramount chief Gawa Undi of the Chewa people. There are frequent cross-border movements of family members carrying goods and presents that often include charcoal. As with most borders in the region, day passes are issued but goods move illegally through routes referred to as '*zalewa*'. The biggest of the '*zalewa*' starts in the Vubwi area of Zambia through to Malawi and then links to the Chipata-Mchinji road. It is

one of the important routes to transport Zambian charcoal through Malawi back into Zambia. Some unscrupulous people often end up referring to this as 'Malawian' charcoal.

3.6 Routes and modes of transport

The movement of goods and people in Zambia is largely linked to the country's major highways. Starting from footpaths and tracks, charcoal is moved to feeder (or secondary, mostly gravel) roads, then to highways such as the Great North, Great East, Lusaka-Kafue-Chirundu, Livingstone-Sesheke, Lusaka-Mumbwa-Mongu and Chingola-Solwezi roads. The highway with the greatest density of charcoal markets is the Great North Road, linking Lusaka, the Copperbelt, Nakonde and beyond. The Great East Road has equally high densities of charcoal markets, but these are restricted to the Luangwa valley and the districts of Nyimba (E) and Katete (E). On some routes e.g. Livingstone-Sesheke, fairly small bags of charcoal (circa 15 kg dry weight) were being sold at the roadside, supporting the observation that charcoal is now produced across the country.

Charcoal bags are moved by wheelbarrows, bicycles and ox-carts to redistribution points or to the nearest roadside markets. Motorised and non-motorised equipment such as bicycles, trucks

Table 13. Number of markets, quantities of bags and charcoal on the Luangwa-Chipata Road

Route	Number of markets	# of bags	Retailing weight (kg bags)	Actual weight (kg)
Chipata-Lundazi	8	50	50	1650.00
Chipata -Chadiza	1	6	10	108.00
Mchinji-Chipata	1	6	*1.5	5.94
		8	2.5	13.20
Chipata-Katete	14	166	50	462.00
Katete- Petauke	6	83	50	2739.00
Petauke- Nyimba	1	1	25	22.50
Nyimba-Luangwa	20	833	50	27 489.00

* Retail-sized bags

Source: Data from current study

(mostly 1 to 2 tonnes and haulage) and ox-carts are used to transport charcoal in and out of Zambia.

It was observed that at Kasumbalesa (C) and Chirundu (S) borders, a daily average of 600 and 225 haulage trucks cross the border, respectively. Assuming that half of these haulage trucks are outward-bound and only one-third carry two 33 kg bags of charcoal, 9.2 tonnes of charcoal is being either legally or illegally exported from Zambia every day, amounting to 3278 tonnes of charcoal per annum. That such large quantities are exported from only 2 border posts, let alone the 16 others such as Kazungula (S) and Mwami (E), which were not part of this exercise, is cause for alarm.

3.7 Charcoal production control mechanisms

Charcoal production is illegal in all the districts so, to produce charcoal, individuals need production and conveyance licences. In the districts studied, most charcoal producers were found not to be applying for the necessary permits (Table 12), which was confirmed during district validation meetings. There are, however, exceptions. It was observed that in Chipata (E)²⁶ and Kazungula (S) districts, more people had charcoal licences than did not. At validation meetings in Chinsali (N), Kasempa (NW), Mwinilunga (NW) and Nakonde (N), most producers said they do not attempt to

obtain licences, citing the general unavailability of FD officials. Control of illegal charcoal production and trade is difficult as the districts are vast with too many routes (formal and informal) to be patrolled.

Charcoal production is a household-based activity and this is the first level at which decisions are made; spouses, children and/or other household members involved in the activity determine the nature of the engagement. The second stage is at the traditional level, where village heads and chiefs are consulted. It was observed that chiefs in the study area may not allow charcoal production in their chiefdoms (e.g. Chief Mpezeni), but their control is weak. Traditional rules controlling access to, and use of, trees have generally broken down; it is unsurprising that most charcoal is produced on customary land. Chiefs and village heads face a dilemma: it is difficult to stop their subjects engaging in charcoal production with so few alternatives for generating income and meeting livelihood demands.

The third and final stage is the state, where permits are obtainable from Forest Department district offices. According to this preliminary assessment, there is some correlation between patrols and numbers of licences issued. When FD officers conduct blitz patrols, the number of applications for charcoal production licences increases proportionately. Limited human and financial resources in the FD have, however, meant that few or no such patrols are being conducted. As a result, illegal charcoal production increases. Since the 1990s, other than for irregular issuance of charcoal

26 Chipata district is closest to Mwami (E) border post, and information on the local charcoal trade was invariably obtained there.

production and conveyance permits, regulation has become almost non-existent.

3.8 Trading regulations for charcoal

Regulations controlling the charcoal trade are generally not promulgated by a single institution. The most relevant regulations, provided for under the Forest Act of 1973, control production (manufacturing) and conveyance (movement). Government requires that traders carry production and conveyance licences, receipts and national registration cards with the name of the person indicated on the licence, whenever trading in charcoal. Other parts of the Forest Act require licencees to extinguish kilns after production. While rules on conveyance are easily enforced, those relating to fire suppression are seldom applied as forest officers rarely inspect production sites. Old licences had regulations printed on them (e.g. do not cut trees in areas less than 30 m from the river or on hills). Current licences, however, do not display such provisions, indicating weak linkages and controls between the different stages of charcoal production and trade.

There is no specific trading licence for charcoal, but district and urban trade by-laws and regulations may apply. These institutions regulate the trading of charcoal under the Market and Bus Station Act of 2007 (GRZ 2007); the Local Government Act of 1991, which allows local government entities to formulate by-laws to extract levies from forest products leaving the district, also applies. Although there are no licences for trading, in some cases such as in Chililabombwe (C), traders obtain permission to trade in charcoal.

3.9 Charcoal distribution and markets

Roadside markets exist in clusters or near trading centres; some have been in existence for 20 years or more. Using results from Eastern province, the team established that some markets were fairly old (between 2 and 30 years) and were linked to individuals, families and groups.

The dominant bag in almost all markets visited during the study was 50 kg (33 kg in actual weight). Field researchers later confirmed the preference for this size of bag. For markets near

homesteads, individual members will run to the roadside to sell charcoal whenever a customer stops to buy. In the case of group markets, someone is always at the roadside to sell what is on display, resulting in competition among traders.

It was noted that traders at these markets had no licences from the FD. Each seller would only exhibit two to five bags at the roadside at a time; the rest of the charcoal was concealed nearby and produced only subject to buyers' requirements during the course of the day. Charcoal bags (mainly 50 kg) coming to these markets are sourced from villages inside the forests for as little as ZMK 13 000 per 50 kg. This would then retail at the roadside for ZMK 20 000; if bound for Chipata (E) or Nakonde (N), it will fetch ZMK 25 000 and ZMK 30 000, respectively. At the retail level, small plastic bags are used for repacking charcoal into smaller quantities of 1–5 kg and sold at prices varying from ZMK 1000 to ZMK 5000.

Bags are transported by bicycles and ox-carts. Hiring an ox-cart to transport 20 × 50 kg bags of charcoal from the production site to the roadside will attract a charge of ZMK 20 000. A 1 tonne truck, which is often hired by traders, will charge ZMK 4000 per bag to transport charcoal from the production site to a market in town. Passengers on long-distance passenger buses that ply the Nyimba (E) to Chipata (E) road will be charged ZMK 3000 per 50 kg bag.



Figure 11. Female traders loading a 50 kg bag onto a Chipata-bound bus in Nyimba district

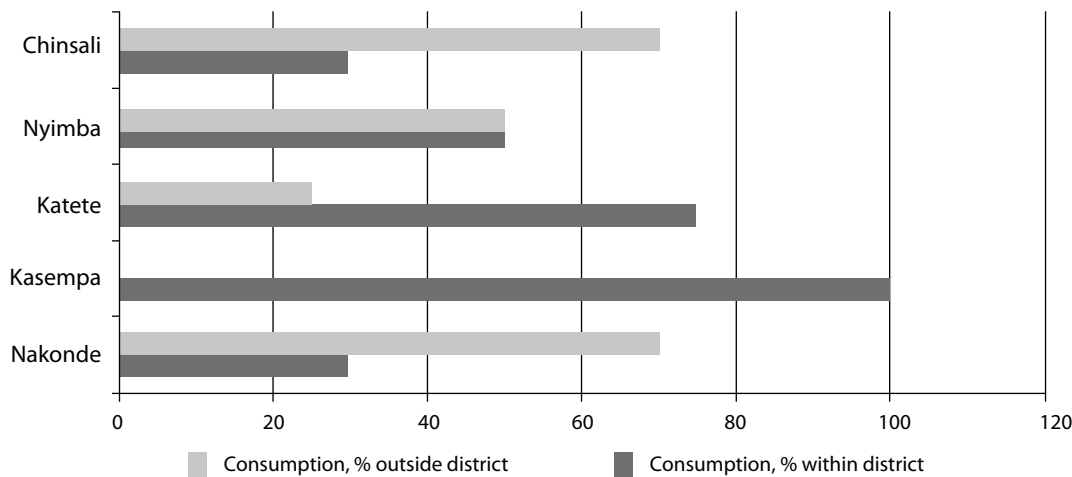


Figure 12. Approximate consumption of charcoal by district

Source: Data from current assessment

Table 14. External markets linked to the study districts

District	Charcoal ferried through district		To	From
	Yes	No		
Nyimba	√		Lusaka, Chipata	
Chinsali	√		Nakonde, Tanzania	
Katete	√		Chipata, especially from Songwe	Mozambique
Nakonde	√		Tanzania	
Kasempa	√	X	Comment: off the main road	

Source: Data from current assessment

In selected districts away from borders, about 57% of all charcoal is consumed locally while the remaining 43% is exported. Only 30% is consumed within Nakonde (N). However, as the district validation meeting showed, Nakonde (N) does not produce much charcoal. In reality, the district is a conduit for charcoal destined for Tanzania from other districts such as Isoka and

Chinsali. At first, Kasempa (NW) district was thought to be exporting very little, if any, charcoal. However, the validation meeting found the district was exporting as much as 60% of charcoal produced (not reflected in Figure 12). Katete (E) district was found to be a thoroughfare for charcoal destined for Lusaka, Chipata (E) and markets in Malawi. Katete (E) is a net exporter with 25% of charcoal produced leaving the district. However, there is a need to assess consumption patterns in greater detail.

The scoping assessment observed that charcoal is often transported at night, early in the morning or late in the afternoon, as well as during weekends, presumably to avoid apprehension by FD staff and, in some cases, district council officials.

There are charcoal markets at local, district, national and international levels. In source areas, producers often sell charcoal to charcoal traders, who ferry it to local district and urban markets; the immediate market for charcoal producers consists of local households, beyond which charcoal is sold at villages and roadside markets and at designated marketplaces. Homestead marketplaces are established by individual landowners or tenants as the need arises. Roadside marketplaces are located and managed by groups of traders, and charcoal bags are transported from the production areas by bicycle or ox-cart. Depending on a town's status,

Table 15. Reasons people engage in charcoal production in the various districts

Nakonde
<ul style="list-style-type: none"> • Occupation, no other jobs • Income generation for school fees, food, medicines • Raise capital for other businesses
Chinsali
<ul style="list-style-type: none"> • Source of income • Easy to trade when available • Good road network • Transport available • Containers are suitable for charcoal movement
Nyimba
<ul style="list-style-type: none"> • Household use; school fees, farming inputs
Katete
<ul style="list-style-type: none"> • Easiest business with minimal entry barriers • Form of employment • Income generation for school fees
Kasempa
<ul style="list-style-type: none"> • Source of income • Cheap source of energy • Done as business

Source: Data from current assessment

these designated marketplaces may be allocated by local district councils or municipalities. In terms of marketing, charcoal is delivered to doorsteps or transported to other towns with more lucrative markets. Charcoal traders also contact established customers by SMS.

Not all charcoal being ferried through districts is actually produced within the district boundaries. For example, Kasempa (NW) was claimed to be merely a conduit for charcoal from the other districts – an issue hotly debated in the district validation meeting. Much of Kasempa district lies off the main road, and charcoal traders using 30-tonne trucks are making inroads into the forest. Such areas deserve further investigation to determine the extent of resource use, as they support the study position that all parts of the country have been affected by charcoal production. Charcoal enters regional export markets such as Tanzania from the Nakonde (N) and Chinsali (N) areas and is imported into Zambia from Mozambique through Katete (E) and Tete (in Mozambique). Locally, charcoal is consumed in neighbouring towns, as well as in Lusaka.

3.10 Reasons for engaging in charcoal production

People within the study districts engage in charcoal production for a number of reasons, including (in no order of importance) the following:

1. A ready market exists for the product.
2. It is a source of ready income.
3. It raises capital for other investments, e.g. agriculture.
4. It is the easiest income-generating activity, with minimal entry barriers.
5. It is a source of employment.
6. Charcoal is non-perishable.

According to this district-level analysis, charcoal production is a source of income not necessarily directed at poverty alleviation; it is the enterprise nature of this engagement that needs to be exploited.

3.11 Markets for charcoal in border areas

Charcoal in the border areas is distributed to local markets, households, door-to-door, institutions and cross-border markets. However, most institutions such as schools and hospitals, which might have been potential customers, were observed to be using firewood.

Over the years, there has been an increase in charcoal movements into all border towns included in this study, attributed to:

- Charcoal becoming an important energy source for heating and cooking (ALL)
- Charcoal being a commonly traded commodity in the areas of Chirundu (S) and Nakonde (N)
- Immigration into the district, with no employment prospects – Kazungula (S)
- A response to ZESCO's²⁷ load shedding and increase in tariffs – Chipata (E) Kazungula (S) and Kazungula (S)
- Increasing buying power and increase in seasonal demand coinciding with seasonal employment at Dunavant²⁸ – Katete (E)
- Towns rapidly urbanising and increasing numbers of consumers – Nakonde (N)

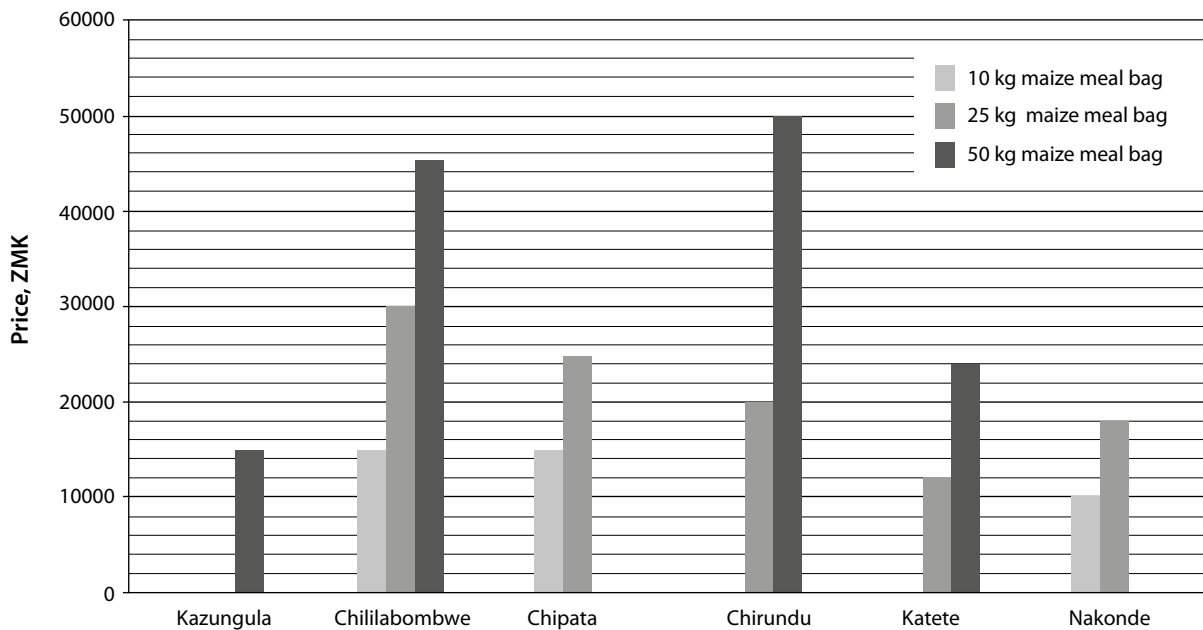
27 ZESCO: Zambia Electricity Supply Company

28 A cotton processing company

Table 16. Destinations of charcoal produced in or ferried through border areas

Border area	Destinations				Comment
	Local markets	Households	Institutions	Cross-border	
Chililabombwe	Local markets			DRC	
Chipata	Wholesalers at market	Female retailers, households		Malawi	Most traders have licences, feel free to move during the day; under-declaration; ZMK 81 000/20 x 90 kg
Chirundu	X	Door to door		Zimbabwe	
Katete	X	Door to door		Mozambique	
Kazungula	X	Door to door		Botswana	
Nakonde	X	Door to door		Tanzania	

Source: Data from current study

**Figure 13. Prices of charcoal in border towns**

Source: Data from current study

- Two new mines and increased demand for charcoal in shanty settlements attracted to the mines – Chililabombwe (C)

Charcoal arriving in border towns is either sold to households door to door, or to small businesses and restaurants or traders and wholesalers in town markets. Individuals or companies wanting to sell charcoal across borders can travel to source areas such as Nyimba (E), or buy from wholesalers and traders in town markets.

In border towns, charcoal prices vary from ZMK 10 000 in Nakonde to ZMK 50 000 in Chililabombwe (C), depending on bag size. Most transactions are cash-based, but there is also exchange through barter and gifts. For example, in Chililabombwe (C) charcoal can be obtained in exchange for *chitenge*.²⁹

²⁹ Printed material used mostly by women, manufactured in DRC

Table 17. Peak months for charcoal prices in border towns

Border area	2010						2011					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Chipata							*	*	*			
Kazungula	*					*						*
Chirundu						*	*	*				
Katete						*	*	*				
Chililabombwe						*	*	*				
Nakonde					*	*	*					

Source: Data from current study

Table 18. Months when charcoal prices are lowest in border towns

Border Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Chililabombwe												
Chirundu												
Katete												
Kazungula												
Nakonde												

Source: Data from current study

The 50 kg maize bags used for bagging charcoal are the most widely sold size in most districts; in Chipata (E) and Nakonde (N), the most common bag size holds 25 kg of charcoal. The 50 kg bags tended to contain the most expensive charcoal and were the 'top end' product across the sites. In the border town of Chirundu (S), no 10 kg bags were recorded; trade was mostly in 50 kg bags. Chililabombwe (C) recorded sales and prices for all the bag sizes and had the second-highest number of 50 kg bags sold after Chirundu. Chililabombwe (C) is a mining town where charcoal demand is high.

While the team established the price range shown in the table, it noted that charcoal prices are influenced by both season and demand (Table 20). In most towns covered by this study, the highest charcoal prices through 2010/2011 were in December, January and February; this coincided with the rainy season, when farmers put more time into their crops than into charcoal production. The other reason for less charcoal production in these months is the difficulty of establishing a kiln due to the weather. In border areas, the charcoal

price is lowest from March to May and from August to September (Table 18). Chipata (E) and Chililabombwe (C) suggested a correlation between prices and quantities supplied, citing higher prices as one of the principal drivers of charcoal production.

The extent to which prices in cross-border towns are affecting demand was raised as an issue. However, most field-based researchers felt that, although there was an effect, there was no evidence to prove it. Kazungula (S), however, indicated that local prices of charcoal were not much different from those in Kasane in Botswana, the major destination of the area's charcoal. Chirundu (S) did illustrate that demand for charcoal in Karoi and Chinhoyi in Zimbabwe influenced charcoal prices. In Nakonde (N), the local charcoal price was lower than in Tunduma on the border with Tanzania. As a result, more entrepreneurs, including Zambians, are encouraged to take significant quantities of charcoal into Tunduma. At Mwami (E), the quantities of charcoal traded in Malawi's Mchinji town are lower than that in Chipata (E) in Zambia; this is largely because Mchinji

offers a very small market and prices offered for the commodity are equally low. This discourages Zambians from taking charcoal for sale in Malawi and therefore limits the number of tradespeople and consequently the quantities supplied.

Understanding the interplay between charcoal supply to border towns and pricing across the border is crucial in understanding the drivers of the cross-border charcoal trade. From Tunduma (Tanzania) to Kasumbalesa (DRC) and all border towns outside Zambia, households face similar problems relating to power shortages and are increasingly reliant on charcoal. More assessments are required to establish whether the price of charcoal in border towns affects the quantity moved across Zambian borders to neighbouring countries.

3.12 Value addition along the trade chain

Charcoal distribution starts from production sites in the countryside, moving through intermediate trade channels involving wholesalers, transporters and retailers to district centre and urban end

consumers. The charcoal is moved from private, communal and state forest estates with the producers as the first link in the trade chain. Wholesalers and transporters then supply to retailers, who put the product on the market for end consumers consisting mostly of households.

Value addition is the extra effort or care taken by a producer to convert raw charcoal into a finer product that is more appealing (or presentable) to consumers. The result is a higher-quality product that reflects the cost of investment in such efforts, and enables the trader to set a higher price for it. Value adding is done principally at three points. The first is at the point of production, when charcoal is packaged into different types of containers; most of these containers would have been used for other products such as cement, maize and maize-meal. This may take place on-site or at a receiving area. Value addition increases costs and eventually the price of the commodity. Second, transportation of charcoal from the production site, homestead or any point other than the marketplace adds cost (see next section). Finally, at marketplaces designated by local authorities, traders pay a fee or market levy to sell the merchandise.

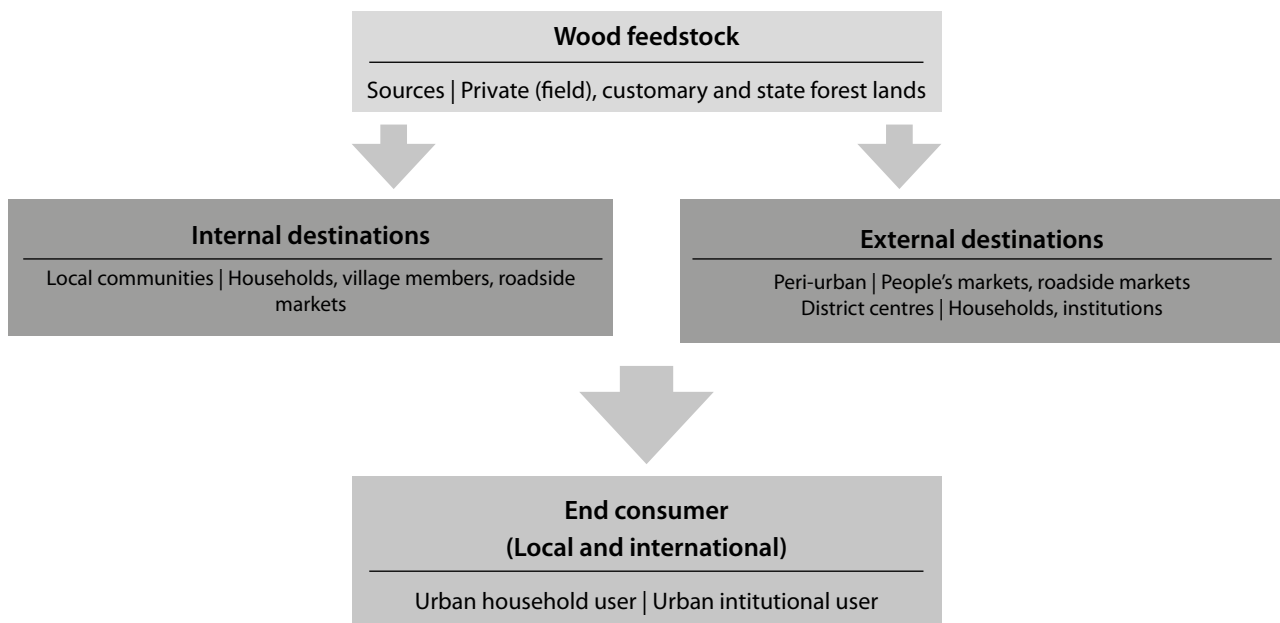


Figure 14. Example of generic charcoal trade flows (Eastern province)

Source: Data from current scoping study

3.13 Cost structure of the charcoal value chain

Charcoal production processes involve a number of costs for producers and traders alike, including:

- Legal fees such as production and conveyance licences paid to the Forest Department
- Fees in the form of levies to local authorities e.g. the district council
- Hired labour
- Tokens/bribes
- Rental of storage space/stall/shop
- Packaging material
- Money paid to private landowners for purchase of trees

Amounts for the various cost factors vary according to district and the intensity of law enforcement within it.

Analysis reveals the total cost for a sale-ready 50 kg bag of charcoal delivered to market is between ZMK 18 700 and ZMK 21 200.³⁰ Costs involved are:

- ZMK 100 000: Production charge per cord, which produces an average of 10 x 90 kg bags of charcoal³¹
- ZMK 5400: Conveyance per 50 kg bag
- ZMK 10 500: Production cost per bag

Thus the total cost per bag is ZMK 16 200:

- ZMK 1000: District council standard levy
- ZMK 10 000 – ZMK 12 000: Bicycle hire in Nyimba and Katete at the rate of 8 bags/day (ZMK 1000/bag in Chinsali)
- ZMK 4000: Ox-cart hire per 50 kg bag

Prices differ across borders. For a 50 kg bag (with a dry weight of 33 kg), the price in Chirundu (S) is USD 0.31/kg, while in Karoi it is USD 0.36/kg. In Mchinji (Malawi), the price is USD 0.07/kg, while in Chipata (E) it is USD 0.18/kg. Differences in price between Tunduma (Tanzania) at USD 0.08/kg, Nakonde (N) at USD 0.06/kg, Kasane (Botswana) at USD 0.27/kg and Kazungula (S) at USD 0.09/kg collectively suggest, with the exception of Chipata (E) and Mchinji, that cross-

border prices are higher and could be fuelling the cross-border charcoal trade. It is unclear why the price of charcoal in Chirundu (S) is so high. The prices for charcoal in 50 kg bags are presented in Table 19.

Traders in some districts expect to incur losses, as indicated by the cost–benefit ratios (in brackets, and see also Figure 15). Only traders in Chirundu (S) (2.51), Chililabombwe (E) (2.26), Chipata (E) (1.5) and Katete (E) (1.20) expect some profit; charcoal traders in Kasempa (NW) (1.00) and Nyimba (1.00) merely provide a service as they are just able to break even. Traders in the other three districts of Kazungula (0.75), Nakonde (0.65) and Chinsali (0.5) incur losses. However, these preliminary assessments are indicative only, as the results are not based on probability sampling.

This section has highlighted the same issues as the preceding literature review, albeit in a different format. As indicated by Arksey and O'Malley (2005), a literature review followed by interviews and discussions often enriches scoping studies and can be seen as a form of 'truthing'. In this section, the following issues were raised.

The environmental impacts of charcoal making were confirmed by the charcoal producers themselves, who concurred with the findings of Chidumayo (1997) and Malambo and Syampungani (2007) i.e. that miombo recovers after charcoal production, adding there has never been a strategy in place to manage that recovery.

While the literature has mainly focused on charcoal production as a way out of poverty for poor households, discussions with charcoal producers indicated that it is just one income-generating strategy to help finance household activities such as agriculture. Charcoal production as an employment-creating opportunity among youth and women was also mentioned. Those involved in charcoal production and trade, especially men, were respected as responsible community members capable of taking care of their families if they invested their income from charcoal well, such as buying cattle, paying school fees and providing food for the family.

While the literature review indicated the existence of charcoal markets, the team was able to characterise these markets through interactions

30 USD 1 ≅ ZMK 4900.00

31 Lack of clarity on bag specifications. For Kasempa and Kazungula districts, the bags from one cord are 10 – 15 x 10 kg and 10 x 50 kg bags, respectively.

Table 19. Charcoal production costs in a calendar year within the study districts

Costs for actors in respective districts				
Cost centre	Producer	Producer-trader	Vendor	Comment
Production licence	-4	-	-	Standard government fees
Conveyance licence	Nyimba: ZMK 54 000/10 bags	-	-	Standard government fees
Hired labour	Nyimba: ZMK 60 000	ZMK 1000 – 4000	-	Producer-hired labour costs are up to the piling stage; for vendors, charges exist but amounts uncertain
	Chinsali: negotiable and in-kind: clothes, credit, beer	-	-	At producer level, mostly by women who hire boys
	Katete: Negotiable, could be ZMK 50 000/bag	-	Nakonde: negotiable ZMK 50 000/unpacking	Further assessment required for producer-trader
	Kasempa: when making charcoal; food for work e.g. beer	-	-	-
Rental of storage space / stall/shop	-	Nyimba: ZMK 100 000 pcm	-	At producer-trader stage, some people do not store charcoal because it is expensive
	-	Katete: ZMK 80 000 pcm	-	-
	-	-	Chinsali: sell mostly in open places where there is no charge	-
Tokens/bribes	-	Negotiable	-	Data required for Nakonde, Nyimba
Trading/ selling licence/council levy	Kasempa: ZMK 2500/bag			For Nyimba, unclear for most of the process from production to trading at end-consumer point
Transport	-	-	-	Further assessment required for Nyimba, Nakonde
Transportation hire/charge	-	-	-	Further assessment required for Nyimba, Nakonde
Council market fees	Nyimba: ZMK 1000/day	Nyimba: ZMK 1000/ day	-	Katete traders find the fees expensive, so do not sell from markets Data required for Nakonde
	-	Katete: ZMK 1500/ day	-	-
	-	-	Chinsali: ZMK 1000/bag	-
Other costs	Katete: ZMK 1000/used cement bag, ZMK 2000/ bag for other materials	-	-	Further assessment required for Nyimba
	Nakonde: ZMK 500 – 1000 per bag depending on size	-	-	-
	Kasempa: ZMK 1000 – 1500 for packaging material	-	-	-
	Chinsali: ZMK 3000/empty bag; ZMK 2000/50kg maize bag	-	-	-

Source: Data from current study

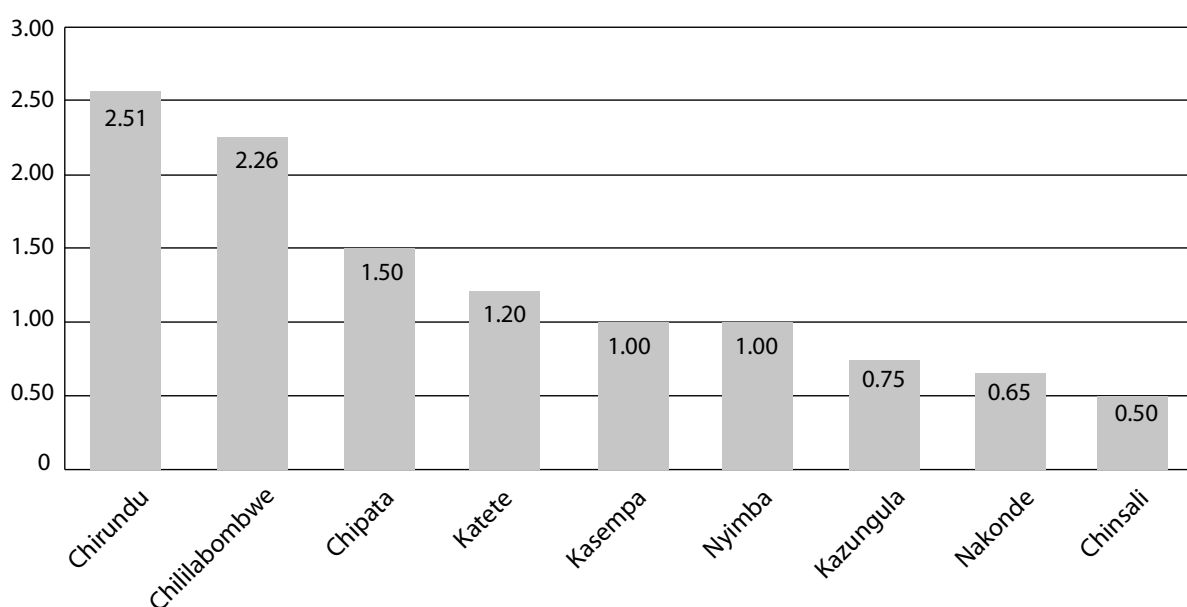
Table 20. Prices for charcoal in districts

Border	Price					
	Zambia (ZMK)	Other areas				
	50 kg bag	USD equivalent \$1=4900 ZMK	Mchinji, Malawi MWK	Nakonde, Tanzania Tsh	Kasane, Botswana Pula/5 kg	Karoi, Zimbabwe USD
Chirundu	50 000	10.20				12.00
Chililabombwe	45 000	9.18				
Chipata	30 000	6.12	400 (USD 2.45)			
Katete	24 000	4.92				
Kasempa	20 000	4.08				
Nyimba	20 000	4.08				
Kazungula	15 000	3.06			10.00	
Nakonde	13 000	2.65		4000 (USD 2.50)		
Chinsali	10 000	2.06				

Exchange rates: 1 USD = MWK 163; TZS 1593; BWP 7.32 BWP^a

Source: Data from current scoping study

a Exchange rates obtained from www.xe.com.

**Figure 15. Cost-benefit ratio for charcoal trading**

Source: Data from current study

with players involved in the charcoal industry. The importance of urban areas as markets for charcoal was also highlighted.

Export of and trade in charcoal are mentioned in the literature. In this study, the movement of charcoal across borders was ascribed to in-transit

haulage trucks, informal cross-border traders and casual transfers by villagers living along borders.

The study also showed weak law enforcement and that people will avoid obtaining charcoal production and conveyance licences as they see these eroding their profits.

4 Indigenous timber production and trade

Zambia's commercial timber stocks have been estimated at 340.1 million m³ of which 75.3% (256 million m³) is located in the country's semi-evergreen forests. About 19 species are widely harvested, but only 3 are highly sought after, namely *Baikiaea plurijuga* Harms, *Pterocarpus angolensis* and *Guibourtia coleosperma*. The distribution of timber species varies across the country's nine provinces and determines where the main logging operations are carried out.³²

Reductions in timber stocks due to repeated exploitation have been noted. Evidence shows that *Baikiaea* forest resources of the Sesheke district in Western province, where harvesting started in the early 1900s, are severely threatened (JICA 1996). These negative trends were also observed by the World Conservation Monitoring Centre (WCMC), prompting them to include *Baikiaea plurijuga* in their 'Threatened Plants of the World' database (UNEP-WCMC 2000).³³ Additionally, reduction in stocks of *Pterocarpus angolensis* prompted the FD to place a temporary ban on its export in 2005.

Zambia's timber and wood products are of major economic importance, providing formal and informal employment for thousands of people. Timber is used in construction and for furniture, packaging materials, joinery and curios. Indigenous timber is used locally to produce furniture, coffins, sleepers, slabs and mining supports. Markets for wood and wood products are found in Lusaka and the Copperbelt towns where structural timber is in demand by the mining industry. Production of industrial round wood from all forest types is estimated to be 1.15 million m³ per annum with a value of USD 12.2 million (Ng'andwe *et al.* 2006).

While the forestry sector contributed an estimated 3.7% to national GDP in 2003, commercial logging contributed 0.3% of GDP during the same period (Puustjarvi *et al.* 2005). Zambian timber also finds a market in the SADC region, particularly South Africa; the Chinese market has more recently also become a major destination for Zambian timber (SADC 2006).³⁴

4.1 Policy and institutional frameworks guiding timber production

Timber production in Zambia is carried out under three different forest licences covering casual, pit sawing and commercial concessions, all provided for under the Forest Act No. 39, Cap 199 of 1973. Casual licences are only issued for small-scale domestic production, while the two most important licences are for pit-sawing and large-scale logging in concessions. These two latter licences enable commercial levels of timber removal, including exports. Requirements for obtaining a specific concession are outlined in Table 21, but amounts required are not shown.

The FD is mandated to oversee the management and use of forests. They are represented in all nine provinces and all districts and therefore well positioned to address forest-related issues. The FD is, however, paralysed by inadequate staffing, inadequate financial resources, lack of transport and political interference; these factors inhibit the agency from applying the rule of law effectively, leading to forest degradation and loss. For example, between 2000 and 2005, the FD lost control of 1 203 535 ha of forest reserves due

32 The country now has 10 provinces.

33 WCMC 2000. The tree conservation database. www.unep-wcmc.org.

34 SADC 2006. SADC Trade, Industry and Investment Review. http://www.sadcreview.com/country_profiles/zambia/zambia.htm

Table 21. Requirements for issuance of forest logging licences in Zambia

Requirement(s)	Licence type	
	Pit-sawing	Concession
Letter of consent/recommendation		
Traditional leadership (chief)	√	√
Local authority (district council)	√	√
ZAWA if area falls within a GMA	√	√
Letter of recommendation (forestry staff)		
District forestry officer	√	-
Provincial extension officer	-	√
Certificate of incorporation		
Certificate of incorporation as a registered company or cooperative in Zambia	√	-
Registered company in Zambia	-	√
Immigration status (if not a Zambian)	-	√
Sawmilling machinery		
Proof of possession of pit-sawing equipment	√	-
Including value addition machinery	-	√***
Tax clearance from Zambia Revenue Authority	√**	√
Maps of area of operation drawn to scales of 1:50 000; 1:100 000; and 1:250 000 with a detailed harvesting plan	√	√
Investment and plan of operation	√****	√
Destination of application		
Principal forestry extension officer	√	-
Director of forestry	-	√
Environmental report		
Environment brief	√	-
An Environmental Impact Assessment (EIA) report as per the Environmental Protection and Pollution Control Act (EPPCA) of 1990 ^a	-	√
Proof of financial viability to run a logging concern	-	√
Banking Pledge - 75% of proceeds to remain in Zambia	-	√

** Now required for pit sawyers

*** Value addition machinery an advantage

**** Pit sawyers do not need an investment plan

Source: Forest Department ^b

a Timber extraction is a proscribed activity under the Zambia's EIA regulations, and has its own regulatory processes and fees.

b http://www.mtenr.gov.zm/index.php?option=com_content&view=article&id=100&Itemid=78. Accessed 23 February 2011.

to encroachment and subsequent degazettement (Hansugule *et al.* 2007; Kalinda *et al.* 2008).

Timber merchants are other key players in the timber industry, either as individuals or as institutions registered with the Registrar of Companies in Zambia for the purposes of

timber export or manufacture of timber products (including sawmills, producers, manufacturers, curio traders and exporters). Apart from timber producers involved in processing, trading and export, neither sawmills, manufacturers, curio traders nor timber merchants involved exclusively in export are registered with the FD. When

these players handle timber, they must obtain a production licence subject to an agreement of sale between the merchant and pit sawyers, overseen by the FD; only then may they apply for a conveyance licence. As with charcoal, timber exports are controlled through the Forest (Timber Export) Regulations of 1997; this bans the export of non-finished timber from natural forests, peeler and sawed logs of any species.³⁵ Exporters must obtain a Customs Export Declaration authorised by four agencies including the Zambia Bureau of Standards, Plant Quarantine and Phytosanitary Services (within the Plant Protection Quarantine Division of the Zambia Agriculture Research Unit), the Zambia Revenue Authority (ZRA) and the Forest Department.

Interviews at selected border posts indicated that cross-border timber movements are authorised by the FD at the port of exit. At the provincial level, the FD's authority is based on prior clearance by the District Forest Office, the Ministry of Agriculture and Cooperatives (sanitary and phytosanitary certification) and the Zambia Bureau of Standards (compliance with export standards) in the district from which timber is to be exported. At the port of exit, the FD's authority enables the Customs and Exercise Department to enter the consignment into the export network of the ZRA. However, in Chililabombwe (C), most timber is smuggled due to the porous border. The situation is similar in Nakonde (N) where indigenous timber is also smuggled.

In Chinsali and Nakonde, timber is mainly sourced from customary lands. Permission to produce timber on customary lands is obtained from chiefs and village heads, who need to know the purpose of the undertaking. There are district regulations regarding timber production, such as no cutting of trees along streams and rivers and around burial sites, and no cutting of fruit and medicinal trees on arable lands. However, the regulations often simply include the national government rules:

- No round wood to be transported outside the district, not even with a conveyance licence.
- Measure (quantify), inspect and mark timber (cants) on site before it is transported.
- Carry both production and conveyance licences whenever transporting the timber, as well as a

general receipt and national registration card bearing the name of the person to whom the licences have been issued.

Despite such controls and regulations, illegal exploitation is common as is trading of illegal timber on local and international markets. For example, the external timber trade is controlled through the Timber Export Policy, which bans the export of round wood (GRZ 1996). This study established that unauthorised round wood concealed in containerised trucks is being exported through established border posts. Such consignments pack timber conforming to authorised specifications near the entrance of the container, while the interior contains round logs. With the help of the public, the FD confiscated a truckload of timber containing both round wood and planed timber at the Chirundu border post in 2010.

4.2 Actors in timber production and trade

Various individuals, groups, institutions and organisations are involved in the timber industry, including transporters, loggers, youth training centres, traditional authorities (especially chiefs), the Forest Department and private companies such as Wult Traders in Kasempa (NW). These actors have different roles, including controlling (e.g. Forest Department, chiefs); extraction in the form of skidding; loading; and transportation out of site and district in cases of export (e.g. timber producers, transporters). Other roles are:

- *Training*: institutions of learning
- *Value addition*: traders and transporters
- *Employment creation*: government and private companies
- *Inspecting and marking timber*: Forest Department
- *Revenue collection*: Forest Department
- *Levies (timber)*: Councils and municipalities
- *Consent for initial approval of issuance of licence*: chiefs

4.3 Timber production cycles and processes

The indigenous timber production cycle involves identifying logging sites through perusal of

35 GRZ. 1997. *Statutory Instrument No.7 of 1997*, Forest Act, Cap 199. Government of Zambia.

Table 22. Documents and costs associated with application for pit-sawing licence

Document	Costs		Service providers
	ZMK	USD	
Assessment of stocks (including map)	600 000	127.65	Individual consultant. PEO and DFO can assist if field costs are covered
Environmental brief	150 000	31.91	Consultant. Involves ECZ
Preliminary operational plan	150 000	31.91	Consultant
Certificate of incorporation	250 000	53.19	Patents and Companies Registration Agency (PACRA)
Taxpayer ID	Variable (3% gross earnings) est. as 67 000	14.25	Zambia Revenue Authority
Letter of consent I	230 000	48.94	Local chief, with recommendations from heads
Letter of consent II	150 000	31.91	District council
Letter of recommendation	-	-	District forest officer
Pit-sawing licence application fee – non-refundable	500 000	106.38	Forest Department HQ
Production licence – after permit is approved	2 700 000	574.46	District Forest Office

Source: Authors' calculations from interviews with pit sawyers and FD personnel; MTENR (2007).

inventories showing availability and quantities of merchantable timber of acceptable size (diameter of 30 cm or more, measured 1.3 m above ground level). Such results often form part of a pit sawyer's or concessionaire's licence application. As noted in Table 21, the procedure for obtaining logging licences is lengthy and now centrally controlled by the FDHQ offices. The implications of fulfilling centralised licensing requirements when applying for a pit sawyer's licence are shown in Table 22. An additional obstruction is the FD requirement for pit sawyers to operate in groups, an obligation that pit sawyers often find difficult to meet.

Until recently, pit-sawing and concession licences covered areas of 5000 ha (three years) and 10 000 ha (five years) respectively. These have now been reduced to 1500 ha and 5000 ha.³⁶ In addition, both pit sawyers and timber concessionaires pay up to ZMK 500 000 when applying for licences. Once granted a licence, pit sawyers are expected to harvest a minimum of

20 m³ and a maximum of 100 m³ per month, with failure incurring a penalty that includes licence withdrawal and refusal to consider subsequent applications. Production figures are higher for commercial timber production, where minimum and maximum stipulations are 50 m³ and 400 m³ per month, respectively. Values of production licences vary by species harvested (e.g. harvesting *Pterocarpus angolensis* costs ZMK 135 000 per m³). In both cases, when timber is moved, a conveyance licence calculated at ZMK 10 800 per m³ is required, which must be issued against a production licence.

Fulfilling all of these requirements merely enables a pit-sawing group to be registered. When operational costs are factored in, the bill facing such groups increases significantly. Additional costs include:

- Felling and initial processing into timber blocks: ZMK 20 000 – ZMK 25 000
- Skidding and transportation to road edge: ZMK 20 000 per log
- Loading: ZMK 20 000 per log
- Transport: ZMK 30 000 per log

³⁶ These new figures were consistently mentioned during the many interviews, but nobody produced a circular or directive to this end.

This study found that pit sawyers can make a profit of ZMK 43 000 per log or ZMK 129 000 per m³ depending on where they sell their logs. Such figures are nowhere near potential maximum revenue. This failure to fully exploit opportunities can be attributed to a number of factors including limited capital, lack of equipment, lack of business training, lack of access roads, remoteness of operational areas and distance from markets.

4.4 Timber production

Timber is produced in nearly all the study districts subject to the availability of stock. Though actual timber stocks available in each district were not assessed, there were indications that they are diminishing. Pit sawyers in Nyimba (E) and Katete (E) indicated they walk long distances to access timber, resulting in lower timber production [as was noted in Kasempa (NW) and Katete (E)]. Katete (E) informed the team it was becoming difficult to find timber in the local markets; production costs had increased due to the long distances involved and harvestable trees were becoming scarce.

Few pit sawyers were found operating legally in the study districts. For example, Kasempa (NW) had only one licensed sawyer. A reduction in the number of logging licences can be attributed to the centrally administered licensing procedure. Kasempa (NW) is fairly remote from Lusaka, so pit sawyers find the process costly. This was one of the issues marked for discussion at the district validation meeting.

In Chinsali (N), the few licensed pit sawyers are often contracted to cut timber by prior arrangement. However, it is not clear whether they fulfil their monthly quotas this way. Such arrangements can easily promote illegal activities, as pit sawyers need not be registered to carry out this work. Nyimba (E) had no reports of current pit-sawing licences, but there was evidence of timber extraction and trade.

Though timber was observed for sale in Chirundu (S), there seem to be very few licensed local timber producers. Chililabombwe (C) had one licensed pit sawyer and two concessionaires. At the time of this study, most licences either had been, or were in the process of being, renewed.

4.4.1 Timber species and production history

Species extracted include *Pterocarpus angolensis* (mukwa), *Albizia antunesiana* H (musase); mululwe; and *Faurea saligna* Harv. (sanginga) in Chinsali (N); *Baikiaea plurijuga* (Zambezi teak) and *Guibourtia coleosperma* (rosewood or muzauli) in Kazungula (S). The timber has been produced for years in the study areas. In Nyimba (E), Katete (E) and Chinsali (N) districts, timber production areas can be found where logging has been going on for longer than 10 years. Areas where logging has been taking place for extended periods include Vizimumba and Mutilizi Resettlement in Nyimba (E); Kagoro and Mayuke in Katete (E); and Chinkombe, Yosamu, Nkula, Ilondola and Chibesakunda areas in Chinsali (N). In Katete (E), logging is even taking place along rivers such as the Kapoche River.

Tree species used in the timber trade in the respective districts are shown in Table 23.

While the study focused on indigenous timber species, it also found evidence that indigenous and imported softwoods were being widely used in the study districts.

Table 23. Tree species extracted for timber

District	Species	
	Locality	Scientific
Nyimba	Mulombe	<i>Pterocarpus angolensis</i>
	Musase	<i>Albizia antunesiana</i>
Katete	Mulombe	<i>Pterocarpus angolensis</i>
Chinsali	Mukwa	<i>Pterocarpus angolensis</i>
	Mululu	<i>Khaya anthotheca</i>
	Musase	<i>Albizia antunesiana</i>
	Mwengele	?
Kasempa	Sanginga	<i>Faurea saligna</i>
	Mukwa	<i>Pterocarpus angolensis</i>
	Mupapa	<i>Azalia quanzensis</i>
	Mweyeye	<i>Albizia antunesiana</i>
Nakonde	Sanginga	<i>Faurea saligna</i>
	Musase	<i>Albizia antunesiana</i>
	Mupapa	<i>Azalia quanzensis</i>
	Mukwa	<i>Pterocarpus angolensis</i>
	Sanginga	<i>Faurea saligna</i>

Source: Data from current scoping study

- Chinsali (N): No pine plantations – carpenters buy their supplies outside the district.
- Kasempa (NW): A eucalyptus plantation exists, but individual traders import softwood from the Copperbelt for use in construction and general retail.
- Katete (E): Pine plantations exist and some processing is done within the district.
- Chipata (E): Pine from Malawi via Mwami (E) border post and Mugubudu Road.
- Nyimba (E): Softwoods are imported from Malawi through Chipata.
- Nakonde (N): A softwood plantation exists, although some timber is imported from Tanzania.

4.4.2 Timber production periods

Most timber within the study districts is produced during the dry season (July to October) (Table 24).

Loggers usually avoid January to March due to difficult operating conditions, as very few pit sawyers have equipment such as tractors to operate during the rains. It would appear that such drawbacks are not considered when licences are issued to pit sawyers, who are expected to fulfil their monthly production quotas.

Table 24. Timber production months

District	2010						2011					
	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Chililabombwe												
Chipata												
Kazungula												
Chirundu												
Chinsali												
Kasempa												
Nyimba												
Katete												

Source: Data from current study

Table 25. Local markets and routes for timber in border towns

District	Cross-border	Local markets	Routes
Chirundu	Zimbabwe	Furniture production; coffins	Lusaka-Chirundu highway
Chililabombwe	Small amounts to the DRC	About 95% to mines for sleepers, underground support, slabbing and poles	Kasumbalesa-Chingola road, footpaths and tracks. The route used by the Copperbelt energy company is the one mostly used for timber smuggling
Chipata	Chipata from surrounding area; Mambwe, Sinda, Petauke	Training schools, households	Great East Road; Mfuwe road; Lundazi road; feeder roads
Kazungula	Livingstone, Kazungula, South Africa, Botswana & Asia (Japan, Malaysia, etc.)		Nakatindi road (Kazungula-Livingstone), and feeder roads from forests
Nakonde		Locally used; most imported	Great North Road

Source: Data from current study

4.4.3 Timber flows

Imports of timber into the districts vary by season. Respondents indicated that high inflows of timber were often experienced from May to November in Nyimba (E) and Katete (E). The situation is similar in the border towns.

Haulage trucks in transit from different towns in Zambia often cross into neighbouring countries. For example, trucks drive from Kitwe to Kasumbalesa (C); from Livingstone through Kazungula (S) border to Kasane in Botswana; and from Lusaka through Chirundu (S) to Zimbabwe. For Chililabombwe (C), timber comes from Solwezi, Chingola, Kasempa and Kitwe and is transported through these districts to the DRC. In Nakonde (N), most timber is illegally moved to Tanzania. In Chirundu (S), there is some production of *Pterocarpus angolensis* but most is

supplied from outside the town via Lusaka. No hardwood timber is produced in Chipata (E), with supplies coming from Sinda, Petauke and Mambwe districts. In addition, some pine is imported from Malawi through the Mwami (E) border post, where sources stated there were no hardwoods exiting to Malawi.

Timber inflows into the districts vary seasonally. Respondents indicated that high inflows of timber were often experienced from May to November in Nyimba (E) and Katete (E). The situation is similar to that in the border towns (Table 26).

Downward trends in timber movements were observed in Katete (E) and Kasempa (NW) districts, as casual licences are no longer being issued. An emerging issue centres on the unavailability of pit sawyers to supply timber to specification, resulting in poor sales or unattractive

Table 26. Seasonal timber inflows into border towns

District	2010						2011					
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
Chipata												
Chililabombwe												
Chirundu												
Kazungula												
Nakonde												

Source: Data from current scoping study

Table 27. Sources of timber ferried through the districts

District	Villages	Chiefdoms	Other districts	State land	Comment
Kasempa	Kanjibiji, Kansono, Mitumba, Kamisenga	Senior Kasempa	-	-	
Chinsali	Yosum, Nkula, Ilondola, Mulilansolo	Nkula, Shimwalule, Chewe, Chibesakunda			Construction of teachers' houses
Nyimba	Solomon, Kaingo, Kimono, Mapulanga, Vizimumba, Chipembi, Ndake	Ndake			
Katete	Kagoro area, Mucheleka, Jungu, Chimbuna	Kawaza, Mban'gombe, Katumba			18 villages but only two involved
Nakonde					From Tanzania

Source: Data from current study

market prices. While it is difficult to separate data on the amount of timber passing through a district (due to poor monitoring), it was noted that in Kasempa (NW) timber transported through the district originates in Zambezi, Mufumbwe and Chavuma districts. Such timber eventually ends up in Solwezi and the Copperbelt towns.

Timber loads were also ferried through border towns to various destinations such as:

- *Chipata (E)*: Mainly softwoods from Malawi, transported to Lusaka and towns along the Great East Road
- *Chirundu (S)*: to Zimbabwe, South Africa and China
- *Chililabombwe (C)*: to the DRC (Kasumbalesa via Chingola from Solwezi, and Kasempa)
- *Kazungula (S)*: to China, South Africa and Botswana
- *Nakonde (N)*: into the district from Tanzania

Over the years, there have been changes in timber movements into border towns. There have been increases in Chipata (E), Chirundu (S) and Nakonde (N) districts for several reasons, including the following: expansion of industries (particularly construction); population growth; and increased timber exports, some of which have been attributed to Chinese involvement. Reasons for the observed decrease in movement in Chililabombwe (C) and Kazungula (S) include fewer active concession licences; timber export policy restrictions on

traders; non-renewal of licences for operators; and up-front costs coupled with procedural difficulties involved in obtaining licences.

4.5 Marketplaces and buyers of indigenous timber

Timber in the study districts is sourced from local villages and produced largely by pit sawyers. Indigenous timber is marketed in border towns at designated market places managed by local authorities [such as the COMESA market in Chililabombwe (C)], as well as construction sites; it is also taken to neighbouring towns. Some districts such as Kasempa (NW) and Nyimba (E) have no designated timber market places. Buyers of indigenous timber include both local (households, retailers, carpenters) and international (Table 28). The market for indigenous timber includes individual retailers, retail institutions such as Wult Trades in Kasempa (NW) and end consumers such as carpenters, households, churches, schools, hospitals, police service and the prison service.

4.5.1 Indigenous timber prices

Apart from standard FD prices per cubic metre for the tree species shown in the table, prices for various quantities and specifications of timber in the border towns were not available (Table 29).

Table 28. Markets for indigenous timber

District	Markets, buyers and marketing services	Comments
Nyimba	Individuals, carpentry, households, door-to-door delivery	No marketplace for timber
Nakonde	Retailers, individuals and households, end consumers	No information for the interior
Kazungula	Retailers, individuals	
Katete	Trade schools, individuals, carpentry, households, door-to-door delivery	No designated marketplaces
Kasempa	Homesteads, door-to-door	No designated marketplaces
Chipata	Retailers, institutions, individual and householder end consumers, wholesalers	
Chinsali	Individuals, carpentry, short message service (SMS)	Owner told to travel to site and collect the timber
Chililabombwe	Retailers, individuals and institutions, individual and institutional end consumers, international buyers	

Source: Data from current study

Table 29. Average prices of indigenous timber in districts

Species		ZMK/m ³	Comments
Zambezi Teak	<i>Baikiaea plurijuga</i>	135 000	
Rosewood	<i>Guibourtia coleosperma</i>	135 000	
Mukwa, Muzwamalowa	<i>Pterocarpus angolensis</i>	135 000	(ZMK) 15 000/piece in Nyimba; 12 500/piece in Katete; 25 000/plank, 330 000/ m ³ or 400 000/m ³ ≤ 25 km radius in Kasempa; 25 000 at production site; 10 000–12 000/piece in Chinsali; 10 000–15 000/ piece in Kazungula
Mupapa	<i>Azelia quanzensis</i>	125 000	Producer: ZMK 25 000/plank in Kasempa
Saninga	<i>Faurea saligna</i>	99 000	Producer: ZMK 25 000/plank in Kasempa
Muyeye	<i>Albizia sp.</i>	90 000	
Musase	<i>Albizia discolor</i>	81 000	Producer: ZMK 25 000/plank in Kasempa
Kapapati	?	81 000	

Source: Data from current study

Table 30. Seasonal variation in timber prices

District	2010					2011			
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Chipata			H	H	H		L	L	L
Kazungula	L	L	L			H	H	H	
Chililabombwe		L	L	L		H	H	H	

Source: Data from current study

Months of highest (H) and lowest (L) timber prices in selected border towns are indicated in Table 30. Fluctuations were due to low supply in the rainy season because of fewer producers. Completion of building projects just before the rainy season was also a factor affecting prices in Chipata (E), where construction was taking place.

Despite the scenario presented in Table 30, timber prices were reported as being constant during the year in all the districts studied. This situation clearly indicates that more research is required to ascertain the true situation.

In cases where prices were higher in neighbouring countries such as the DRC and Botswana, timber prices in cross-border towns affected the amount of timber moved over the border. In the DRC, timber prices were almost double those in Zambia, while prices in Tanzania and Malawi were lower than in Zambia. Cash was the commonest form

of payment for timber and the only type of transaction in border areas. Other areas have isolated instances of credit, in-kind (donation) and barter (such as radios).

4.5.2 Timber distribution

As with charcoal, timber is distributed from rural production sites to urban end consumers through intermediate trade channels involving wholesalers, transporters and retailers.

4.5.3 Value addition

Value addition to timber involves working a round log into a more refined product. This occurs in two stages. First, round logs are worked in the field into four-cornered blocks authorised by law for transportation out of the production site. Second,

and more significantly, logs or cants are processed from their raw form into planks for export through sawmilling. The latter attract not only a higher price but also a wider market. This stage requires higher capital and/or operating investments.

4.5.4 Cost structure of the timber value chain

There are costs that typical timber producers, timber producer/traders and trader/vendors incur during a calendar year. These include standard government production and conveyance licences, labour, rental of storage space or infrastructure, trading/selling licences required by the council or municipality, tokens/bribes and transportation charges. Only standard government charges and selected information on producers are provided below for Kasempa (NW), as other districts still need further assessment:

- Production licence: ZMK 135 000 per m³ (*Pterocarpus angolensis*).
- Conveyance licence, per m³ of all timber: ZMK 10 800.
- Hired labour:
 - a. ZMK 2500/log for a loader, regardless of log size.
 - b. ZMK 5000 for cutting and cant fashioning or production.
 - c. ZMK 50 000 lunch allowance paid to FD staff for working outside their office stations to facilitate timber marking; currently this also attracts transport costs to field site for the FD personnel. Under normal circumstances, however, the FD should cover such costs as they are part of the licensing process.
- Token/facilitation fees: exist, but difficult to establish details.
- Transportation hire/charge:
 - a. About ZMK 500 000 – 1 000 000 per truck, depending on the transporter, area and other factors.

- b. ZMK 6 million – transport from Kasempa to Kitwe.
- Council fees: ZMK 5000/log for timber leaving the district.
 - Phytosanitary certification of export timber from the Ministry of Agriculture and Cooperatives.
 - Timber is zero-rated, although export requires forms from the ZRA and customs offices, which also incur costs.
 - Product certification from the Zambia Bureau of Standards.

In summary, results presented in this section are very similar to those presented for charcoal production. Some key emerging issues are as follows:

- a. The social and environmental impacts of timber production are more implied than explicit. With concessions and pit-sawing licences not being monitored or forming part of a research programme, there is limited understanding of their impacts.
- b. Reductions in volumes of harvestable timber have been noted in the literature in the case of *Baikiaea plurijuga* in Western province (JICA 1996); this study made similar observations with regard to *Pterocarpus angolensis* in Katete (E) and Nyimba (E) districts.
- c. Obligatory processes and procedures for pit sawyers and concessionaires are long and cumbersome, involving repeated trips to Lusaka. This is more difficult where one needs to travel to different ministries and agents to obtain documentation, while increasing the cost of doing business, contrary to government pronouncements.
- d. According to field-based researchers, some respondents recognised that indigenous timber was moving to neighbouring countries such as the DRC, Tanzania and Zimbabwe, and also to China and South Africa.

5 Conclusions and recommendations

5.1 Introduction

This study was prompted by the need to understand the production and trade of charcoal and timber in Zambia, and the impact of the industries on forests, people and livelihoods. Charcoal and timber have been extracted from Zambia's forests for many years, but few studies and research have aimed at understanding their contribution to livelihoods and their implications for sustainable forest management. Assertions have been made that both charcoal and timber production methods are inefficient and contribute significantly to forest degradation and deforestation. It is correct to say that the impacts of charcoal production have been exacerbated by reduced controls, limited monitoring and ineffective law enforcement. Similar limitations apply in the case of timber production, but the FD could address these issues by ensuring adherence to the stipulations of the various licences. Partial attempts to curb the rate of forest degradation due to charcoal and timber production have centred on reducing the number of licences issued, delaying their issuance and, in some cases, cancelling concession licences. The extents to which charcoal and timber production and trade contribute to deforestation are not well documented.

Both charcoal and timber contribute to security of income and livelihoods of rural and peri-urban households. Therefore, it is important to study production of, and trade in, these commodities. In so doing, more effective and efficient methods of production might be put in place. This will help ensure that forests are sustainably managed and that policy frameworks clearly stipulate the roles of forest users and institutions mandated with forest management. In this way, the contribution of these products to GDP can be ascertained and their contribution to local livelihoods enhanced. Although production of these two products is currently restricted, levels of informal production

are far greater than authorities admit. Since there is no effective monitoring of charcoal or timber activities in protected and open customary forests, these activities are not sustainable and concerns about their contribution to deforestation and forest degradation in Zambia continue to grow (GRZ 2010).

There have been calls from both government and civil society to curb charcoal production and to exercise greater control over the indigenous timber industry; it is presumed that both are major causes of deforestation and forest degradation. It is also assumed that charcoal use as an energy source is increasing; the national energy policy indicates that charcoal accounts for 70% of energy used by Zambians (MEWD 2008). Even households with access to electricity use charcoal as it is cheaper and allows them to cook during periods of power outages, low supply and load shedding.

Evidence of unauthorised production, transportation and trade in charcoal can be deduced by the manner of transactions. For example, transportation of the product to towns and district markets takes place either early in the morning, late at night or over weekends when monitoring and controlling authorities are off duty. The proliferation of informal production and trade has been attributed to inadequate human and financial resources in the Forest Department. To control this industry and ensure it contributes to national development, it is necessary to study and document production and marketing processes, and then to share findings widely.

Very little has been done towards understanding the extent of indigenous timber production and its past effects on forests. Valuable timber species such as *Baikiaea plurijuga* are declining; in districts such as Kaoma, merchantable sizes became increasingly scarce between 1985 and 1996 (JICA 1996). This has prompted government and civil

society to believe that logging contributes to forest degradation and deforestation, although little documentation exists on its impacts, especially with regard to tree recovery. Further research linked to proper monitoring of the production, consumption and marketing of indigenous timber is needed.

There is growing concern that gaps in policies governing these processes are inadvertently promoting and perpetuating informal production of, and trade in, charcoal and timber. Ineffective law enforcement, use of a centralised licensing system and limited field inspections are promoting poor management of production processes. This study looked at policies affecting charcoal and timber production and trade. It noted existing policies and acts dealing with trade, energy, environment and customs that influence how these products are managed. These specific policies and acts need to be harmonised with forestry policy and legislation if production and trade of charcoal and timber are to be efficiently and sustainably managed.

5.2 Findings

This scoping study has shown that most charcoal is traded and consumed within Zambia's urban areas and district centres. Although export bans have been imposed, observations in border towns and at border posts show that almost half of the haulage trucks crossing these borders carry between one and three ~50 kg bags of charcoal each, often declared as being for domestic use. Informal cross-border charcoal traders, often in collusion with cross-border haulage drivers, also fall into this category. The quantity of charcoal leaving the country in this way is probably enormous and the ban on exports is probably ineffectual. In addition, Zambia's borders are porous; families extend across borders and share gifts such as charcoal. A study on the regional charcoal trade might lead to its inclusion within trade agreements. Enforcing trade bans on a commodity used throughout the region runs the risk of driving the trade underground and promoting corruption.

Export of timber is allowed, but there is a ban on round wood (both indigenous and exotic species); exportation of planks is promoted instead. Production is currently dominated by pit sawyers operating in registered groups; most also export,

preferring to sell their timber to merchants and concessionaires. Illegal production is promoted by some merchants who hire villagers to cut logs for a designated fee without obtaining the necessary clearances beforehand. Largely incapacitated by lack of equipment and capital, pit sawyers are the group most affected by bureaucracy surrounding licences and, as a consequence, most of them operate illegally. The study found that forest products are often exported together with manufactured goods, making the trade difficult to monitor or to determine whether charcoal and timber were a legal component of the export. Further studies on the domestic trade and export of charcoal and timber will be required if their potential contributions to national development and GDP are to be ascertained.

5.3 Methods and tools revisited

This study sought to identify and analyse social, economic and environmental issues pertaining to charcoal and timber production and trade in Zambia, as well as to understand its contribution to the regional charcoal and timber trade. To achieve this goal, it was necessary to use a set of complementary methods and tools outlined below. A scoping study is heavily reliant on literature, observations and interviews. Existing literature was extensively reviewed and emerging themes were validated in the field through interviews and observations. The team also conducted limited investigations in seven border towns and five study districts. There was insufficient time for more comprehensive fieldwork, the bulk of which was undertaken by field-based researchers using a checklist (Annex 2). As local residents, they found it easy to address the issues under study. The survey period coincided with the Zambian general election, and this affected people's outlook on charcoal, which had acquired a political flavour. Six district validation meetings were held, bringing together chiefs, councillors, charcoal and timber producers, government officials and other local leaders. Preliminary results were presented and comments received.

5.4 Revisiting specific objectives and outputs of the study

The Terms of Reference for this study appear in Appendix 1. For the sake of completeness, we are

revisiting each objective to ensure the study's major findings have been clearly articulated. The following recommendations have been suggested.

5.4.1 Identify and characterise charcoal and timber production flows and trade trends in Zambia (objective a)

The team was required to present information on product flows (charcoal as well as timber) from source to market in selected districts in the Eastern, Northern and Northwestern provinces of Zambia. Identification of, and information on, the industry's key stakeholders and their respective roles in the charcoal and timber trade in the above districts were also required. In the following sections, some specific findings are outlined.

Charcoal and timber production

The contribution of the charcoal and timber industry to livelihoods in Zambia is reasonably well documented (Mickels-Kokwe 2005; Puustjärvi *et al.* 2005; Jumbe *et al.* 2008). Both charcoal and timber production have severe implications for the survival of indigenous forests. They affect forest cover and species survival, contribute to accelerated soil erosion and siltation of surface water bodies, diminish the value of forests through the loss of NTFPs and reduce the capacity of forests to sequester CO₂.

It is therefore unsurprising that the GRZ categorised charcoal production as one of the leading causes of deforestation and forest degradation in the country (ECZ 2006; GRZ 2010; GRZ 2011). This study made the following observations:

- Charcoal production is now widespread and the commodity is sold along most roads in the country, signalling that more forests are being, and will continue to be, affected until there is a deliberate policy shift.
- Larger forms of transport (i.e. 10–30-tonne trucks) are now moving charcoal, indicating that it can now be transported in bulk far from its origin.

Commercial timber stocks are declining in districts where the favoured timber species are

found. Reductions in species such as *Baikiaea plurijuga* have caused alarm (JICA 1996; UNEP-WCMC 2000). Unscrupulous timber merchants hire untrained villagers to cut logs, often cutting stems less than 30 cm in diameter, which is against the law. While there are bans and restrictions on timber and charcoal export, they have not been effective in controlling the impact of these activities on forests. There is a body of research showing that miombo species will eventually regenerate following disturbance (Kambewa *et al.* 2007; Syampungani 2008; Chidumayo 2010). However, this work has largely focused on former charcoal production sites and not other areas such as agricultural expansion that indicate general drivers of vegetation disturbance. Although miombo woodlands do not occur in some districts, it is believed that most logged areas are likely to recover given that removal of merchantable timber does not cause too much damage (Chidumayo 2010).

Current trends show that both charcoal and timber production can cause irreparable harm to forests unless sustainable approaches are adopted, and monitoring and reporting systems put in place by the FD.

Recommendations

- i. Schemes aimed at promoting sustainable charcoal production should be adopted and supplemented by alternative feedstock for charcoal production, such as sawdust and bamboo.
- ii. Areas of long-term charcoal production such as Cholowa and Malata in Nyimba (E) and Kagoro in Katete (E) should be studied so that management lessons learned can inform the design of sustainable charcoal production strategies.
- iii. Following Syampungani (2008) and Chidumayo (2010), further research is recommended in different woodland types to explore the impacts of charcoal production and the potential for woodland recovery.
- iv. Using remotely sensed data, concession management plans and records, as well as ground truthing, vegetation changes at selected sites should be measured both before and after logging.
- v. In the light of climate change, increased community participation, REDD+, carbon markets and other initiatives, a better

understanding of the impacts of charcoal and timber production on forests is needed.

Charcoal production – kilns

Existing literature shows a wood to charcoal conversion factor for Zambia of 20–25%, indicating considerable waste (Kalumiana and Shakacite 2003). This study has shown that charcoal production is no longer the preserve of experienced charcoal producers, and that households only require sufficient labour and existing household equipment to start producing charcoal. One factor contributing to inefficiency during charcoal production is the inexperience of ‘newcomer’ charcoal producers (Seboka and Mequanint 2006). Given that more and more households with little or no training are now producing charcoal, the stage is set for increasing wood-use due to their inefficient production techniques. This calls for intensified capacity-building and further relevant research.

Recommendations

- i. There is a need for capacity-building programmes to train newcomers to the industry in more efficient and effective methods of charcoal production, in order to reduce waste.
- ii. Greater efforts should be directed towards improving kiln designs, based on environmentally sound, easily adopted technologies. Incentives for the adoption of such technologies should be provided.
- iii. Environmental management education must ensure that capacity-building programmes are offered, emphasising the science of energy conservation and using extension materials in a straightforward and easy to understand format.

Charcoal consumption

Charcoal accounts for 70% of Zambia’s energy usage, and is a major source of cooking fuel and heating for 85% of urban households. Current per capita household consumption of charcoal in urban Lusaka is about 1.63 kg of charcoal per day; in both the literature and during interviews, we noted that total consumption will likely increase due to population growth. Zambia is urbanising at 3.2% per annum, which will increase charcoal demand unless affordable alternative

sources of energy are found. With the exception of the Lusaka Clean Development Mechanism (CDM) project (Technoshare Associates 2011), the study did not find any energy conservation initiatives on the ground. Charcoal use could be significantly reduced if more energy conservation initiatives were put in place in urban areas. The issue of capacity-building and conservation and environmental education cannot be overemphasised.

Recommendations

- i. Local government authorities such as municipalities and district councils should be encouraged to work with charcoal consumers in their jurisdictions, while encouraging people to adopt energy-saving stoves and other conservation measures.
- ii. Previous energy consumption studies have focused on Lusaka (Technoshare Associates 2011); it is strongly recommended that future studies focus on Zambia’s other urban areas to better understand charcoal demand and the amount of wood consumed.

Charcoal trade

The study established that, in most of the study sites, the majority of charcoal is transported to, and consumed in, district and urban centres. Seasonality is a critical aspect affecting the transport of charcoal, which in turn affects charcoal production. Most charcoal production in Zambia takes place during the dry season when agricultural activities are less labour-intensive. This is also when rural households plan for the forthcoming agricultural season. Their own charcoal requirements – combined with cash demands such as school fees – often force such households to produce and sell charcoal. Charcoal is increasingly viewed as the easiest way to earn money, which explains its widespread production. Seasonality thus affects both the production and marketing of charcoal, with more charcoal being traded during the dry winter than in the rainy summer months. The scoping study established that charcoal is moved throughout Zambia and beyond its borders. As part of the study, the movement of charcoal was traced from source to market in district centres, towns and at border crossing points. The flow patterns are as follows.

i. Local buyers/consumers

Charcoal producers sell their commodity to local rural households, targeting businesses, teachers, nurses, development workers and other affluent households. They also provide or sell charcoal for social occasions such as weddings, church gatherings and funerals. Institutions such as boarding schools and hospitals tend to use firewood and are less likely to buy charcoal. At the local level, charcoal can be exchanged for food or other goods, or else is given as a gift to strengthen social relationships. For villages along the border, charcoal can also be part of cross-border exchanges between people of the same ethnic group. These include the Chewa along the Malawi-Mozambique-Zambia border and around the Mwami, Chanida, Ukwimi and Luangwa border-crossing points. Transport is usually non-motorised.

ii. Local village markets

Locally produced charcoal may also be moved to permanent or weekly village markets where the former (possibly located on a feeder road) might consist of a few retail outlets selling an assortment of food items or agricultural goods. Producers sell charcoal here in small quantities due to the limited buying power of local people, or exchange it for clothes or other commodities. Major buyers are usually untargeted local salaried people, civil servants or NGO personnel on missions to such villages. Weekly markets attract people from neighbouring villages and farther away, some of whom may include charcoal buyers. Charcoal bought at such markets is largely for local home consumption, but some buyers may transport charcoal to urban areas for resale. Village markets can also be found along the border where they form centres for exchange.

iii. Roadside markets

Charcoal is often moved to the roadside and packaged for sale in markets created specifically for this purpose. Such roadside markets are more competitive than the previous two points of sale as they are set up gratis and usually no levies are paid. Gravel roads often act as feeder roads linking major highways such as the Great East Road between Lusaka and Chipata. Roadside markets are frequent along these roads, except where they are linked to an established trading centre. Charcoal arriving at such markets is supplied either by the charcoal producers themselves or by traders, some

of whom act as roadside vendors. Roads such as the Great North Road linking Lusaka and the Copperbelt towns act as conduits for charcoal from distant areas. Long-haul truck drivers and intercity travellers obtain most of their charcoal from roadside markets; from these markets, it is transported for home consumption or moved over the border in several ways, including big intercity buses and haulage trucks.

iv. District centre markets

Charcoal is sold in almost all district centres, with individual charcoal-producer households supplying charcoal to markets established under the Markets and Bus Stop Act of 2007 and controlled by local authorities. Katete (E) has two district-level markets supplying charcoal, but depending on their size, other centres might have more markets. It is important to highlight that charcoal is at times supplied by traders and not necessarily charcoal producers themselves. In either case, charcoal brought into a district centre may be sold on a door-to-door basis or to targeted households by prior arrangement. In some cases, traders have their own stalls where they repackage and sell charcoal procured in the hinterland. In most markets, wholesalers buy charcoal from producers and traders, and transport the charcoal outside of the districts.

v. Urban markets

Charcoal is moved directly to urban markets by producers and traders, who will also sell to individual households by prior arrangement or door-to-door. As with district markets, they may also move charcoal to designated markets (Markets and Bus Stop Act of 2007) and sell it to wholesalers, restaurants and stallholders. Bicycles and trucks are the major modes of transport.

vi. Border towns and crossing points

Dynamics of the charcoal trade in border towns are very similar to other urban areas; the only difference is that some buyers might be crossing the border with charcoal. It was observed that charcoal for the cross-border trade is often obtained from cheaper roadside markets inland. In Chililabombwe (C), it was observed that charcoal 'poachers' from the DRC enter Zambia to produce charcoal that they then transport back to the DRC. The situation is similar along the Malawi-Zambia border, where cross-border ethnic ties result in

charcoal moving through cash purchases, as gifts and in exchange for food.

vii. Cross-border trade in charcoal

While the bulk of Zambian charcoal is consumed within the country, there is evidence that some of it is moved to neighbouring countries. This implies that Zambian charcoal production may be responding to demand in neighbouring countries rather than to local markets, especially if the price is higher. From data gathered during this study, it was noted that – with the exception of Mchinji in Malawi – the price of charcoal in the cross-border towns of Tunduma (Tanzania), Kasane (Botswana) and Karoi (Zimbabwe) is higher by as much as USD 0.04 per kg of charcoal. In addition, policies governing trade must be reconsidered to ensure that most, if not all, production and trade are formalised.

The study determined that charcoal is currently traded throughout Zambia and the region, specifically to Malawi, Mozambique, Tanzania and Zimbabwe. There is evidence that trade in charcoal is supported by informal cross-border traders and border villages, leading to losses in government revenue. While the export of charcoal is banned, informal cross-border traders have ensured that the trade continues.

Recommendations

- i. Further investigations are required to fully understand charcoal movements within Zambia.
- ii. Further investigations are required on losses the government is incurring through maintaining charcoal export bans.
- iii. Understanding the interplay between charcoal supply to border towns and cross-border pricing is crucial in terms of understanding the drivers of the cross-border charcoal trade. More assessments are required to establish whether the price of charcoal in border towns affects the quantity moved across the border from Zambia.

Current trends in charcoal production

The study identified changes in the trends of production and trade of charcoal, including:

- a. Poverty levels are fairly constant in charcoal-producing districts and this, coupled with poor employment opportunities and limited options for meeting livelihood demands, has turned more and more rural households to charcoal production. In Katete (E) and Chinsali (N), women have now also started producing charcoal.
- b. Charcoal production is widespread throughout Zambia. Against a backdrop of limited monitoring by the FD, this development raises questions of sustainability and control.
- c. There are signs that species preferred for charcoal production are declining and that charcoal producers are turning to previously unused species and indigenous fruit trees such as *Uapaca kirkiana*. Some areas of miombo woodland have been transformed into *Combretum/Acacia*-dominated woodlands as a result of charcoal production.
- d. There are indications that some areas have been degraded through heavy, localised charcoal production; trees have been removed from whole hillsides and stream banks, thereby accelerating soil erosion and the subsequent siltation of rivers and other surface water bodies.
- e. An increase in the spread and types of markets selling charcoal suggests a shift from the former dominance of roadside markets, indicating greater demand for charcoal than ever before.
- f. Charcoal production and trade are being increasingly dominated by illegal operations that take advantage of a lack of monitoring and irregular issuance of licences.

Similar trends have been noted for timber, the major difference being there are no dedicated market stalls for timber. Cants and, in some cases, planks are often left at the roadside by pit sawyers. The trends noted here are:

- a. An increase in undersized cants (i.e. less than 30 cm in diameter) at roadsides often placed there by speculators.
- b. An increase in the number of species previously not designated as commercial timber species yet that seem to be in demand elsewhere, e.g. *Brachystegia spiciformis* Benth.
- c. An increase in the number of pit sawyers operating without licences, due to a general failure to obtain such licences.

Recommendations

- i. That the FD monitors and controls charcoal production and trade to the fullest extent of the law, accompanied by studies aimed at developing an understanding of the impacts of the trends highlighted above.
- ii. That provincial offices grant licences for pit sawyers, as it is often very difficult for such people to travel to Lusaka. Additionally, requirements for this licence are too stringent for the average pit sawyer.

5.4.2 Institutional and socio-economic aspects of charcoal and timber production and trade

Objectives (b) and (c) were to: *Document institutional and socio-economic aspects related to production, trade and the consumption of charcoal and identify the main policy and institutional arrangements governing charcoaling, and commercial timber extraction.*

Legal and policy frameworks

The primary policy and legal framework for charcoal production and trade in Zambia is the Forest Act No. 39 of 1973, underpinned by the Forest Policy of 1998. Charcoal production is found at the confluence of the forest and energy policies, as well as in the national policy on environment. While the energy policy is fairly comprehensive on charcoal production, it is lacking on timber production as the Department of Energy has no mandate over trees and forests and can only make recommendations. The forest policy, which directly addresses the forest resource base and its use, is not explicit on issues of charcoal production and trade. However, initiatives under the Forest Department such as the Zambia Forest Action Programme (ZFAP 1995) are explicit with regard to sustainable charcoal production. The national policy on environment, originally aimed at harmonising all policies relating to the environment, has lately also addressed charcoal production. However, its attempt at providing a coordinating mechanism is weakened by the extent to which participating institutions are scattered through numerous government departments and ministries. The fifth

and sixth national development programmes call for sustainable charcoal production but, without a clear policy specifically addressing its promotion, the development of a unified strategy will not be feasible.

Charcoal and timber are zero-rated in terms of tax in the Customs and Exercise Act No.5 of 2007, which promotes informal trading. As with charcoal, the export of timber is addressed under the Forest (Timber Export) Regulations of 1997. Under this statutory instrument, the export of non-finished timber from natural forests, as well as peeler and sawed logs of any species, is banned.³⁷ Exporters must obtain a Customs Export Declaration authorised by four agencies, namely the Zambia Bureau of Standards, Plant Quarantine and Phytosanitary Services, the Zambia Revenue Authority and the Forest Department.

Recommendations

- i. Forest policy should incorporate aspects relating to sustainable charcoal production contained in both the national policy on environment and the energy policy, as this would strengthen initiatives such as the proposed revision of the Zimbabwe Forest Action Programme (ZFAP). Policy overlaps could thereby be eliminated.
- ii. Clarity should be provided in the form of a statutory instrument (SI) or regulation in the act that explicitly calls for sustainable charcoal production.
- iii. It is critical that producers can access training and other forms of support to improve conversion efficiency and ensure sustainable production.

Institutional arrangements

The study confirmed the centrality of the FD to institutional arrangements for charcoal and timber production and trade in Zambia, as provided for in the legal and policy framework. An area of concern is the mismatch between forest policy and the Forest Act of 1973 vis-à-vis community participation in forest management. The FD's promulgation of Statutory Instrument 52 of 1999

³⁷ GRZ 1997. *Statutory Instrument No.7 of 1997, Forest Act, Cap 1999*, Government of Zambia.

was to plug this gap (GRZ 1999). Unfortunately, while the SI did allow for community participation in forest management, it did not enable communities to directly obtain benefits through user groups such as charcoal producers (Bwalya 2007), thereby contributing to the failure of JFM. The study also established that experiences from JFM were never factored into national forest policy.

Stakeholders with vested interests in the production and trade of charcoal and timber include:

- a. Households in rural areas, whose primary source of income derives from the sale of charcoal. It is difficult to ascertain their precise numbers.
- b. Unorganised smallholder farmers producing charcoal as an auxiliary source of income. In this case, income earned from charcoal production is invested in crop and livestock production or other household needs such as school fees.
- c. Charcoal producers, who exploit gaps within and between traditional rules and statutory provisions for accessing timber for charcoal and timber to justify their actions.
- d. Men, women and youth involved in the production, transportation and marketing of charcoal, with males dominating production. The same situation prevails with timber production.
- e. Timber production dominated by males (mainly pit sawyers linked to concessionaires and timber merchants) and local carpenters producing goods for local use.
- f. Individuals hired to provide labour during various stages of charcoal and timber production and trade. Locals are often hired through cash or in-kind to help with tree cutting, stacking kilns and transportation (in the case of charcoal) and for log-skidding or canting (for timber).
- g. Charcoal transporters using motorised and non-motorised means of transport, with bicycles being prominent at the local level and haulage trucks at the cross-border level.
- h. Local government marketplaces serving as exchange points for charcoal and timber for cash payments.
- i. Local-level institutions such as chiefs and district councils providing clearances to entities that require permission to produce charcoal or

conduct logging operations and who should become actively involved in management of the resource base.

Recommendations

- i. Roles of local-level institutions such as traditional leaders should contribute to management and control of charcoal production. These roles should include determining which local rules for resource allocation and control can reinforce statutory provisions under the Forest Act. Further, the level of awareness of any rules among producers and traders, including transporters, must be ascertained.
- ii. District councils, chiefs and other local-level institutions should be encouraged to take greater interest in the management of forests through the enactment of by-laws, especially those used for charcoal and timber production. Current by-laws only cover the generation of levies.
- iii. There are problems with institutional arrangements vis-à-vis the issuance of timber exploitation licences, with bureaucracy as a limiting factor. Bureaucracy affects two groups of people: actors joining the industry, and actors failing to operate formally in the timber business. Many illegal operations are initiated due to delays in issuing licences.
- iv. The FD should provide additional support to pit sawyers, including technical and business management skills.
- v. Like pit sawyers, charcoal producers must be organised so they can access training and other forms of support required to ensure sustainable production. To do this, the element of illegality must be removed.

Socio-economic aspects

The literature indicates that charcoal and timber are among forest-based enterprises contributing to household incomes (Mickels-Kokwe 2005; Puurstiv *et al.* 2005; Jumbe *et al.* 2008). These publications highlight the importance of these resources, from the household to national level. Resources are generally viewed as informal activities and therefore not factored into national accounts.

The importance of these commodities at the household level is often down-played within policy frameworks and even in the extension thereof. Charcoal producers are generally seen as poor and charcoal production as an income-generating strategy for poor rural households. Yet this study established that charcoal production is a form of employment for a broad range of individuals and groups of both genders.

In the case of timber, the use of local labour by both concessionaires and pit sawyers contributes towards local employment and incomes. The potential of pit sawyers is compromised by limited access to capital, equipment and business training.

Recommendations

- i. A strategy needs to be developed to ensure that necessary data on the production of and trade in charcoal and timber are captured and incorporated in national accounts.
- ii. Efforts should be made to remove negative stigma around charcoal, where producers are generally perceived as poor. This applies both at the local and national levels. However, this should be done strategically as legitimising the sub-sector industry may promote some unguided influx and pose greater threats to forest resources.
- iii. Both charcoal producers and pit sawyers should be provided with technical and business training to enable them to practise better resource management.

5.4.3 Literature search

Objective (d) of this study was to: *'Carry out a comprehensive review of grey and published literature and data on the production and trade of charcoal and timber in selected countries in the southern African region'*.

To determine how charcoal and timber move between countries in the region, this study reviewed relevant literature covering Zambia, Malawi, Tanzania and Mozambique. With the exception of Sibale and Banda (2008), who explicitly state that charcoal is traded between Mozambique and Malawi, the rest of the literature

reviewed (Ackello-Ogutu and Echessah 1998; Minde and Nhkuwa 1998) only inferred the existence of cross-border charcoal trade. Reports on informal cross-border trade are not explicit on types of goods moved; this is not surprising as the bulk of research in these countries has focused on biophysical aspects of charcoal rather than policy and institutional arrangements.

In terms of timber, evidence in the literature shows movements of wood and wood products between the countries (SADC 2006; ZDA 2011). While earlier studies were unclear whether these products were hardwoods, this study indicated the movement of softwoods, mainly from Malawi and Tanzania to Zambia. The SADC regional trade reports indicate a trade in 'wood charcoal', but do not offer information on quantities or other data. The extent to which 'industrial charcoal' from Namibia, South Africa and Zimbabwe has influenced such reports is unclear.

Recommendations

- i. Any future research on regional trade policy dialogue should also focus on the charcoal and timber trade.
- ii. Customs authorities should actively capture data on charcoal that is moving legally across borders.
- iii. As informal cross-border traders seek more recognition, they too should start to submit figures on goods supplied, including charcoal.

Alienation of customary land

Zambia has earmarked 1.3 million ha of land for biofuels and other agricultural products (Mudenda 2011). Others more familiar with land issues in Zambia may point out this area of land going to the private sector is insignificant given the vast size of the country. However, the effect at the local level can be very significant indeed. We have shown that loss of land to private sector investment in Nakonde (N) will lead to losses of caterpillar (*finkubala*) harvesting areas. It will create more conflict between charcoal producers and *finkubala* harvesters on the remaining land and, more importantly, will effectively reduce the amount of forest available for charcoal production.

Recommendations

- i. As land is allocated for investment, the environmental and social impacts of such acquisitions should be carefully studied. Charcoal and timber production must also form part of this analysis.
- ii. Explore the extent to which charcoal production can be carried out by displaced farmers as part of land clearance for new landowners. Such production must be done in a sustainable manner.

Regional market integration

Regional market integration takes place under the auspices of the SADC protocol and the COMESA Free Trade Area (SADC 1996; DPC and Associates 2010). These initiatives list timber as a commodity, but are less specific on charcoal. Bilateral trade agreements do drive trade, but in the case of Zambia there are no intra-SADC bilateral agreements; as a member of the COMESA Free Trade Area, Zambia can trade with all other member states. A draft agreement with Mozambique has been put on hold and discussions on a bilateral agreement with Malawi have been suspended, while fresh discussions take place with Zimbabwe. Current trade with Malawi and Zimbabwe is conducted under the COMESA trading arrangement. In addition, there have been attempts to set up a Mozambique-Malawi-Zambia growth triangle aimed at enhancing trade and investment among the three countries, although this has not yet been accomplished.

Recommendation

- i. Future bilateral trade discussions should also take a critical look at the charcoal trade under the auspices of energy provision.

Development of informal cross-border trade

Charcoal and, to a lesser extent, timber are moved across borders by informal cross-border traders (Musonda 2004; Lesser and Moisé-Leeman 2009). Informal cross-border trade within the SADC is an accepted fact (SADC 2003) and lately with the COMESA STR (DPC and Associates 2010) there is a tacit attempt to address the needs of this sector vis-à-vis trade. It is not surprising that informal cross-border traders are becoming organised and more visible. The thin dividing line between the legal and illegal aspects of their business remains a cause for concern, as they operate under the radar in the majority of cases. Recent developments in the formation of cross-border associations in some countries in southern Africa, including Zambia, mean that individual country associations in the region will form trading links with each other – albeit under the radar.³⁸

Recommendation

- i. Authorities in the respective countries should endeavour to ensure that ICBTs are aware of the provisions of the COMESA STR so that data and information can be obtained for the purpose of policy formulation.

³⁸ Where goods and money are exchanged for resale.

6 References

- Ackello-Ogutu, C. and Echessah, P.N. 1998 Unrecorded cross-border trade between Tanzania and her neighbors: implications for food security. Regional Trade Agenda Series, Technical Paper 89. USAID, Office of Sustainable Development, Bureau for Africa, Washington, DC.
- Adams, M. 2003 Land tenure policy and practice in Zambia. Department for International Development (DfID), London.
- Ahenkan, A. and Boon, E. 2011 Non-timber forest products (NTFPs): clearing the confusion in semantics. *Journal of Human Ecology* 33(1): 1–9.
- Anderson, S., Allen, P., Peckham, S. and Goodwin, N. 2008 Asking the right questions: scoping studies in the commissioning of research on the organization and delivery of health services. *Health Research Policy and Systems* 2008 6/7. Doi: 10.1186/1478-4505-6-7.
- Arksey, H. and O'Malley, L. 2005 Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology* 8(1): 19–32.
- Bose, P., Garside, N. and Oddie, R. 2003 The politics of participation. Ethics of development-induced displacement. Project Working Paper #2, Toronto, Canada.
- Burchell, G., Gordon, C. and Miller, P. (eds) 1991 *The Foucault effect: studies in governmentality*. Harvester Wheatsheaf, Hemel Hempstead, UK.
- Bwalya, B. 2007 Katanino Joint Forest Management Area, Masaiti district Zambia: challenges and opportunities. Ph.D. Thesis. Norwegian University of Life Sciences (UMB), Norway.
- Bwalya-Mukumbuta, N.C. 2004 North Western Province situation analysis report. National environmental policy consultations, Lusaka, Zambia.
- Campbell, D., Feibig, M., Mailloux, M., Mwanza, H., Mwitwa, J. and Sieber, S. 2011 Zambia environmental threats and opportunities assessment (ETOA). USAID, Washington, DC.
- Central Statistical Office (CSO) 2006 Living conditions monitoring survey (LCMS). CSO, Lusaka, Zambia.
- Central Statistical Office (CSO) 2010 Poverty trends report, 1996–2006. Lusaka, Zambia.
- Central Statistical Office (CSO) 2011 Zambia 2010 Census of population and housing. Preliminary population figures. February 2011, CSO, Lusaka, Zambia.
- Chidumayo, E.N. 1997 Woodfuel and deforestation in southern Africa – a misconceived association. *Renewable Energy for Development* 10(2): 2–3.
- Chidumayo, E.N. 1993a Responses of miombo woodland to harvesting: ecology and management. Stockholm Environment Institute, Stockholm, Sweden.
- Chidumayo, E.N. 1993b Zambian charcoal production: miombo woodland recovery. *Energy Policy* 21: 586–597.
- Chidumayo, E.N. 1991 Seedling development of the miombo woodland tree, *Julbernardia globiflora*. *Journal of Vegetation Science* 2: 21–26.
- Chidumayo, E.N. 2001 Land cover transformation in central Zambia: role of agriculture, biomass energy and rural livelihoods. Paper to an international symposium on 'area studies: past experiences and future visions', Kyoto University, Kyoto, Japan. 19–22 January.
- Chidumayo, E.N. 2010 Strategies for combating deforestation in Zambia. Makeni Savanna Research Project. Mimeo. Lusaka, Zambia.
- Chidumayo E. and Chidumayo, C. 1984 The status and impact of charcoal consumption in urban Zambia. Natural Resources Department, Lusaka, Zambia.
- Chidumayo, E. and Gumbo, D.J. In press. The environmental impacts of charcoal production in tropical ecosystems of the world: a synthesis. *Energy for Sustainable*

- Development. www.sciencedirect.com/science/article/pii/S0973082612000476.
- Chidumayo, E.N. and Kalumiana, O.S. 1991 Responses of miombo woodland to wood harvesting and management (draft). Annual report for period April 1990 – Feb 1991, Stockholm Environmental Institute, Stockholm, Sweden.
- Chidumayo, E.N., Masialeti, I., Ntalasha, I. and Kalumiana, O. 2002 Charcoal potential in southern Africa (CHAPOSA): final report for Zambia. European Union and the University of Zambia, Lusaka, Zambia.
- Community Markets for Conservation (COMACO) 2010 Reversing trends of charcoal making – a growing challenge for COMACO. www.itswild.org/no608/reversing-trends (9 December 2011).
- Curtis, B. 2009 The Chirundu border post: detailed monitoring of transit times. SSATP Discussion Paper No. 10. Regional Integration and Transport in Sub-Saharan Africa. Sub-Saharan Africa Transport Policy Program.
- de Miranda, R.C., Sepp, S., Ceccon, E., Mann, S. and Singh, B. 2010 Sustainable production of commercial woodfuel: lessons and guidance from two strategies. World Bank, Washington, DC.
- Deweese, P.A., Campbell, B.M., Katerere, Y., Siteo, A., Cunningham, A.B., Angelsen, A. and Wunder, S. 2010 Managing the miombo woodlands of southern Africa: policies, incentives and options for the rural poor. *Journal of Natural Resources Policy Research* 2: 57–73.
- Dhlodhlo, R. 2002 Policy and legal framework. *In*: ZIMOZA Management Plan: Transboundary Natural Resources Management. Unpublished project document.
- Douthwaite, R., Chitalu, M. and Lungu, C. 2005 Zambia national environment situational analysis report. Ministry of Tourism, Environment and Natural Resources, Republic of Zambia.
- DPC and Associates 2010 Final report on the evaluation of the COMESA simplified trade regime. COMESA, Lusaka, Zambia.
- Ellegård, A., Chidumayo, E., Malimbwi, R., Pereira, C. and Voss, Ing. A. 2001 Charcoal potential in southern Africa (CHAPOSA). <http://sei-international.org/mediamanager/documents/Publications/Climate/chaposa.pdf>.
- Environmental Council of Zambia (ECZ) 2008 Zambia environment outlook report 3. Lusaka, Zambia.
- Falcão, M.P. 2008 Charcoal production and use in Mozambique, Malawi, Tanzania, and Zambia: historical overview, present situation and outlook. *In*: Kwaschik, R. (ed) 2008. Proceedings of the conference on charcoal and communities in Africa. Maputo, Mozambique, 16–18 June.
- Fernandez, A., Richardson, R.B., Tschirley, D. and Tembo, G. 2009 Wildlife conservation in Zambia: impacts on rural household welfare. FSRP Working Paper 41. Food Security Research Project, Lusaka, Zambia.
- Foley, G. 1986 Charcoal making in developing countries. Earthscan, London.
- Food and Agriculture Organization of the UN (FAO) 2010 Criteria and indicators for sustainable woodfuels. FAO, Rome.
- Geist, J.H. and Lambin, F. 2002 Proximate causes and underlying driving forces of tropical deforestation. *Bioscience* 52(2): 143–150.
- Girard, P. 2002 Charcoal production in Africa: what future? *Unasylva* 211.
- Government of Malawi 2009 Malawi biomass energy strategy. Lusaka, Zambia.
- Government of the Republic of Zambia 1997 Statutory instrument No.7 of 1997, Forest Act, cap 119. Government Printer, Lusaka, Zambia.
- Government of the Republic of Zambia 1997 Forest (Timber Export) Regulations 1997 under the Forest Act, cap 311 Statutory instrument No. 7 of 1997. Government Printer, Lusaka, Zambia.
- Government of the Republic of Zambia 1998 Zambia national forest policy. Government Printer, Lusaka, Zambia.
- Government of the Republic of Zambia 1999 Statutory instrument No. 52 on Local Forests (Control and Management). Regulations of 1999. Government Printer, Lusaka, Zambia.
- Government of the Republic of Zambia 2004. National Decentralisation Policy. Government Printer, Lusaka, Zambia.
- Government of the Republic of Zambia 2006 National long-term vision 2030. Ministry of Finance and National Planning, Government Printer, Lusaka, Zambia.
- Government of the Republic of Zambia 2008 Forestry department annual report 2008. Forestry Department, Ministry of Tourism, Environment and Natural Resources, Lusaka, Zambia.
- Government of the Republic of Zambia 2010 Zambia quick start initiative. Collaborative programme on reducing emissions from

- deforestation and forest degradation in developing countries. Zambia National Joint Programme Document. Lusaka, Zambia. Government of the Republic of Zambia 2011 Sixth national development plan 2011–2015: sustained economic growth and poverty reduction. Government Printer, Lusaka, Zambia.
- Gumbo, D. and Mudenda, C.G. 2009 A study of social and environmental impacts of large-scale land acquisitions in Zambia. Inception Report. Zambia Land Alliance. World Bank, Washington, DC.
- Grant, M. and Booth, A. 2009 A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal* 26: 91–108.
- Handavu, F., Syampungani, S. and Chisanga, E. 2011 The influence of stump diameter and height on coppicing ability of selected key Miombo woodland tree species of Zambia: a guide for harvesting for charcoal production. *Journal of Ecology and the Natural Environment* 3: 461–468.
- Hansungule, M., Feeny, P. and Palmer, R. 1998 Report on land tenure, insecurity on the Zambian Copperbelt. Oxfam, UK.
- Held, D. 1996 Models of democracy, 3rd edition. Polity and Stanford University Press, Cambridge, US.
- Herd, A.R.C. 2007 Exploring the socio-economic role of charcoal and the potential for sustainable production in the Chicale Regulado, Mozambique. MSc Thesis. University of Edinburgh, Scotland.
- Hibajene, S.H., Chidumayo, E.N. and Ellegard, A. 1993 The Zambia charcoal industry. Inventory of wood used in charcoal production in Zambia. <http://www.bcnet.org/bsp/bcn/learning/african/chidumay.htm>.
- Hibajene, S.H. and Kaweme, S. 1993 Study on the electrification of low-income households in large urban areas of Zambia. Stockholm Environment Institute, Stockholm, Sweden.
- Hibajene, S.H. and Kalumiana, O.S. 2003 Manual for charcoal production in earth kilns in Zambia. Department of Energy, Ministry of Energy and Water Development, Lusaka, Zambia. www.bioquest.se/reports/Charcoal%20production%20manual%20ENGLISH.pdf.
- Hill, M. 1997 The policy process in the modern state. Prentice Hall, London.
- Hofstad, O., Kohlin, G. and Namaalwa, J. 2009 How can emissions from woodfuel be reduced? *In*: Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W. and Wertz-Kanounnikoff, S. (eds): Realising REDD+: National strategy and policy options, 237–249. CIFOR, Bogor, Indonesia.
- James, A.N. 1999 Institutional constraints to protected area funding. *Parks* 9(2): 15–26.
- Jayne, T.S., Mason, N., Burke, W., Shipekese, W., Chapoto, A. and Kabaghe, C. 2011 Mountains of maize, persistent poverty. Food Security Research Project (FRSP) Working Paper 48. Lusaka, Zambia. www.aec.msu.edu/agecon/fs2/zambia/index.htm.
- Japan International Cooperation Agency (JICA) 1996 The forest tree resources management study for Zambia teak forests. JICA and Ministry of Environment and Natural Resources, Government of the Republic of Zambia.
- Johnson, F.X. and Rosillo-Calle, F. 2006 Biomass, livelihoods and international trade: challenges and opportunities for the EU and southern Africa. Climate and Energy Programme. Stockholm Environment Institute, Stockholm, Sweden.
- Jubilee–Zambia Debt and Trade Desk 2008 A synthesis of case studies on trade constraints faced by local communities. Jesuit Centre for Theological Reflections (JCTR) Debt, Aid and Trade Programme. Lusaka, Zambia.
- Jumbe, C., Bwalya, S. and Husselman, M. 2008 Contribution of dry forests to rural livelihoods and the national economy in Zambia. Paper to Governing shared resources: Connecting local experience to global challenges. 12th Biennial Conference of the International Association for the Study of Commons, Cheltenham, UK, 14–18 July.
- Kalinda, K., Bwalya, S., Mulolwa, A. and Haantuba, H. 2008 Use of integrated land use of integrated land use assessment (ILUA) data for forestry and agricultural policy review and analysis in Zambia. Forest Management and Planning Unit of the Forestry Department, FAO and the Zambian Forestry Department, Ministry of Tourism, Environment and Natural Resources, Zambia.
- Kambewa, P., Mataya, B., Sichinga, K. and Johnson, T. 2007 Charcoal: the reality. A study of charcoal consumption, trade and production in Malawi. Small and Medium Forestry Enterprise Series No. 21. International Institute for Environment and Development (IIED), London.

- Kammen, D.M. and Lew, D.J. 2005 Review of technologies for the production and use of charcoal. Renewable and appropriate energy laboratory report, Energy and Resources Group and Goldman School of Public Policy, University of California, Berkeley, US.
- Karsenty, A., Drigo, I.G., Piketty, M.G. and Singer, B. 2008 Regulating industrial forest concessions in Central Africa and South America. *Forest Ecology and Management* 256: 1498–1508.
- Kasali, G. 2007 Impact of current policies on the performance of the millennium development goals in Katete district of Zambia. *In: Energizing the millennium development goals – setting the enabling environment (e-mindset) in southern Africa. Energy and Environmental Concerns for Zambia / Practical Action Southern Africa Lusaka, Zambia.*
- Kutsch, W. L., Merbold, L.W., Ziegler, M.M., Mukelabai, M., Muchinda, O. and Scholes, R.J. 2011 The charcoal trap: miombo forests and the energy needs of people. *Carbon Balance and Management* 6: 5. <http://www.cbmjournal.com/content/6/1/5>.
- Kwaramba, M. 2010 Evaluation of the Chirundu one-stop border post: opportunities and challenges. Trade and Development Centre, Harare, Zimbabwe.
- Kwaschik, R. (ed) 2008 Foreword. *In: Proceedings of the Conference on Charcoal and Communities in Africa. Global Non-timber Forest Products; International Network for Bamboo and Rattan (INBAR); International Fund for Agricultural Development (IFAD) and Ministry of Agriculture, Mozambique. 16–18 June.*
- Lesser, C. and Moisé-Leeman, E. 2009 Informal cross-border trade and trade facilitation reform in Sub-Saharan Africa. OECD Trade Policy Working Papers No. 86, Organisation for Economic Cooperation and Development (OECD), Paris, France.
- Levac, D., Colquhoun, H. and O'Brien, K. 2010 Scoping studies: advancing the methodology. *Implementation Science* 5: 69.
- Long, N. 1992 From paradigm lost to paradigm regained? The case for an actor-oriented sociology of 'development'. *In: Long, N. and Long, A. (eds) Battlefields of knowledge: The interlocking of theory and practice in social research and development. Routledge, London.*
- Makano, R.F. 2008 Does institutional capacity matter? A case study of the Zambian Forestry Department. Ph.D. Thesis, University of Missouri-St. Louis, US.
- Makano, R.F. and Moombe, K. 2012 Kasempa district, local level institutional assessment report.
- Makumbe, R. 2012 SADC Transport Corridors-Investment Opportunities. Regional Infrastructure Development Programme for SADC. SADC-Japan Infrastructure Investment Conference. 14–24 March 2012. Gaborone, Botswana
- Malaisse, F. 1978a. The Miombo ecosystem. *Natural Resources Research* 14: 589–606. UNESCO, Paris.
- Malambo, F.M. and Syampungani, S. 2008 Opportunities and challenges for sustainable management of miombo woodlands: the Zambian perspective. Working Papers of the Finnish Forest Research Institute 98: 125–130.
- Malimbwi, R.E., Zahabu, E., Monela, G.C., Misana, S., Jambiya, G.C. and Mchome, B. 2005 Charcoal potential of miombo woodlands at Kitulangalo, Tanzania. *Journal of Tropical Science* 17(2): 197–210.
- Malimbwi, R.E., Zahabu, E., Kajembe, G.C. and Luoga, E.J. 2007 Contribution of charcoal extraction to deforestation: experience from CHAPOSA Research Project. Sokoine University of Agriculture, Morogoro, Tanzania.
- Matthews, E. and Hammond, A. 1999 Critical consumption trends and implications degrading Earth's ecosystems. World Resources Institute, Washington, DC.
- May-Tobin, C. 2011 Wood for fuel. *In: The root of the problem: What's driving tropical deforestation today? Chapter 8. Union of Concerned Scientists www.ucsusa.org/forests.*
- Mays, N., Roberts, E. and Popay, J. 2001 Synthesising research evidence. *In: Fulop, N., Allen, P., Clarke, A. and Black, N. (eds) Studying the organisation and delivery of health services: research methods, 188–220. Routledge, London.*
- Mickels-Kokwe, G. 2005 The forest contribution to rural small-scale household income in Zambia. *In: The contribution of the forest sector to the national economy and poverty reduction in Zambia. SAVCOR INDUFOR – Forestry Department, Zambia and Ministry for Foreign Affairs of Finland. Lusaka, Zambia.*

- Minde I.J. and T.O. Nakhumwa, 1998, Unrecorded cross-border trade between Malawi and neighboring countries, SD Publication Series Technical Paper No. 90, USAID, Africa Bureau.
- Ministry of Energy and Water Development (MEWD) 2008 National energy policy. Lusaka, Republic of Zambia.
- Ministry of Tourism, Environment and Natural Resources, Forest Department. Lusaka, Republic of Zambia www.mtenr.gov.zm/index.php?option=com_content&view=article&id=100&Itemid=78. (23 February 2011).
- Molnar, A., Scherr, S. and Khare, A. 2004 Who conserves the world's forests? Community-driven strategies to protect forests and respect rights. Forest Trends and Ecoagriculture Partners. Washington, DC.
- Mokoena, M.R. 2007 Maritime transport: regional integration and intra-African trade. Port Management Authority of Eastern and Southern Africa (PMAESA), African Ports/ Maritime Conference, Victoria, Mahe, Seychelles, 10–14 December. www.sadc.int (12 January 2012).
- Mudenda, C. 2011 Case study on foreign direct investment in Zambia. Paper to the African Union–Economic Commission for Africa–African Development Bank Joint Policy Initiative (mimeo).
- Mugo, F. and Ong, C. 2006 Lessons of eastern Africa's unsustainable charcoal trade. ICRAF Working Paper 20. World Agroforestry Centre, Nairobi, Kenya.
- Mukosha, J. and Siampale, A. 2008 Integrated land use assessment – Zambia. Food and Agriculture Organization (FAO) of the UN, Rome – Forestry Department, Lusaka, Zambia.
- Mulombwa, J. 1998 Woodfuel review and assessment in Zambia. EC–FAO Partnership Programme, Addis Ababa, Ethiopia.
- Mulenga, M.N. and Lusumbo, E. 2005 The potential of engineering timber products in the Zambian economy. Paper to national symposium on timber industry in Lusaka, Zambia, 29–30 September.
- Mulenga, B.P., Richardson, R.B., Mapemba, L.D. and Tembo, G. 2011 Contribution of non-timber forest products to rural household income in Zambia. Food Security Research Project Working Paper 54. Lusaka, Zambia.
- Musonda, M. 2004 Overview of informal trade in the SADC region – where are we now? Paper to regional workshop for SADC informal traders. 11–12 February. Harare, Zimbabwe.
- Mutamba, M. 2007 Farming or foraging? Aspects of rural livelihoods in Mufulira and Kabompo districts of Zambia. CIFOR, Bogor, Indonesia.
- Muzvidziwa, V. 2005 Women without borders: informal cross border trade among women in the Southern African Development Community region (SADC). Organisation for Social Science Research in Eastern and Southern Africa (OSSREA), Addis Ababa, Ethiopia.
- Mwampamba, T.H. 2007 Has the woodfuel crisis returned? Urban charcoal consumption in Tanzania and its implications to present and future forest availability. *Energy Policy* 35: 4221–4234.
- Mwenya, W.N.M. 2004 Environmental policy development: Northern province: Districts (Chilubi, Chinsali, Isoka, Kasama, Mbala, Mpika, Mungwi and Nakonde) Situation Analysis, Environment and Natural Resources Management Department, Government Printers, Lusaka, Zambia.
- Ndhlovu, E. 2010 General overview of the Copperbelt, Northern and Northwestern provinces of Zambia. Finnish Forestry Initiative Working Session, 6–7 August. Finnish Embassy Lusaka, unpublished project development document.
- Newbronner, E. and Hare, P. 2002 Services to support carers of people with mental health problems. Consultation report, Social Policy Research Unit, University of York, York, UK. www.sdo.lshtm.ac.uk/mentalhealthcarers.htm, see also Levac *et al*, 2010 opt cit p 6.
- Ng'andwe, P., Muima-Kankolongo, A., Banda, M.K., Mwitwa, J.P. and Shakacite, O. 2006 Forest revenue, concession systems and the contribution of the forestry sector to poverty reduction and Zambia's national economy. Draft analysis prepared for the Food and Agriculture Organization (FAO) of the UN in conjunction with the Forestry Department and the Ministry of Tourism, Environment and Natural Resources. Lusaka, Zambia.
- Nijkamp, P. 2009 Regional development as self-organised converging growth. *In*: Kochendorfer-Lucius, G. and Pleskovic, B. (eds) Disparities and development policy. Berlin Workshop Series 2009, 265–281. World Bank, Washington, DC.
- Northern Rhodesia Government 1928 The report of the Northern Rhodesia native reserves commission. Livingstone.

- Nyembe, M. 2011 An econometric analysis of factors determining charcoal consumption by urban households: the case of Zambia. Master's Thesis, Environmental Economics and Management, Uppsala, Sweden.
- Ojanen, M. and Ndhlovu, E. 2010a. Pre-programme studies carried out by local and/or regional consultants. Finnish Embassy Lusaka, Zambia unpublished project development document.
- Ojanen, M. and Ndhlovu, E. 2010b Planning meeting report innovative programme on integrated forest management Kafue Gorge Regional Training Centre 31 Nov.–1 Dec. Finnish Embassy Lusaka, Zambia unpublished project development document.
- Pawson, R. 2002 Evidence-based policy: in search of a method. *Evaluation* 8(2): 157–181.
- Puná, N.H. 2008. Charcoal supply chain study in Mozambique. *In*: Kwaschik, R. (ed) Proceedings of the conference on charcoal and communities in Africa, 62–76. International Fund for Agricultural Development (IFAD)/Global Non-timber Forest Products Partnership/International Network for Bamboo and Rattan (INBAR). Maputo, Mozambique.
- Puustjarvi, E., Mickels-Kokwe, G. and Chakanga, M. 2005 The contribution of the forest sector to the national economy and poverty reduction in Zambia. Forestry Department and Ministry for Foreign Affairs of Finland. Helsinki, Finland.
- Ritchie, J. and Spencer, L. 1994 Qualitative data analysis for applied policy research. *In*: Bryman, A. and Burgess, R.G. (eds) *Analysing qualitative data*, 173–194. Routledge, London.
- Roe, D. and Nelson, F. 2009 The origins and evolution of community-based natural resource management in Africa. *In*: *Community management of natural resources in Africa: impacts, experiences and future directions*. International Institute for Environment and Development (IIED) *Natural Resource Issues* 18: 2–12.
- Sam, T. and Shepherd, G. 2011 Community forest management. Background paper for the United Nations Forum on Forests Secretariat UNFF9: Forests for people, livelihoods and poverty eradication. UN Economic and Social Council (ECOSOC), New York. www.un.org/esa/forests/pdf/publications/CBFM.pdf.
- Schwartz, M.W., Caro, T.M. and Banda-Sakala, T. 2002 Assessing the sustainability of harvesting *Pterocarpus angolensis* in Rukwa region in Tanzania. *Forest Ecology Management* 170: 259–281.
- Seidel, A. 2008 Charcoal in Africa: importance, problems and possible solution strategies. GTZ Household Energy Programme. Eschborn, Germany.
- Serenje, W., Chidumayo, E.N., Egneus, H. and Elegard, A. 1994 Environmental impact assessment of the charcoal production and utilisation system in central Zambia. Stockholm Environment Institute (SEI) Energy, Environment and Development Series 32. Stockholm, Sweden.
- Shackleton, S. and Gumbo, D. 2010 Contribution of non-wood forest products to livelihoods and poverty alleviation. *In*: Chidumayo, E. and Gumbo, D. (eds) *The dry forests and woodlands of Africa: Managing for products and services*. Earthscan, London.
- Shackleton, S., Shackleton, C. and Shanley, P. (eds) 2011 *Non-timber forest products in the global context*. Springer, Berlin Germany
- Southern African Development Community (SADC) 1996 SADC Trade Protocol. SADC, Gaborone, Botswana.
- Sibale, B. and Banda, G. (2004) A study on livelihoods, governance and illegality: law enforcement, illegality and the forest dependent poor in Malawi. Centre for Development Management, Lilongwe, Malawi.
- Solwezi District Council 2008 Solwezi District State of the Environment Report. Solwezi, Zambia.
- Southern African Development Community (SADC) 2003 SADC Regional Indicative Strategic Development Plan. SADC, Gaborone, Botswana.
- Southern African Development Community (SADC) 2006 SADC Trade, Industry and Investment Review. SADC, Gaborone, Botswana. www.sadcreview.com/country_profiles/zambia/zambia.htm.
- Southern African Development Community (SADC) 2008 SADC Trade performance review 2006. SADC, Gaborone, Botswana. www.sadctrade.org/files/Intra-SADC-trade-performance-review-2006-8-zambia.pdf.
- Southern African Development Community (SADC) 2010 SADC forestry strategy: 2010–2020: Making forests work for the economic development of the region. SADC, Gaborone, Botswana.

- Syampungani, S. 2008 Vegetation change analysis and ecological recovery of the Copperbelt miombo woodland of Zambia. Ph.D. Thesis, University of Stellenbosch, South Africa.
- Syampungani, S., Chirwa, P., Akinnifesi, F., Sileshi, G. and Ajayi, O. 2009 The miombo woodlands at the cross roads: potential threats, sustainable livelihoods, policy gaps and challenges. *Natural Resources Forum* 33: 150–159.
- Tanzania Association of Oil Marketing Companies (LPG Committee) 2002 The true cost of charcoal: a rapid appraisal of the potential economic and environmental benefits of substituting LPG for charcoal as an urban fuel in Tanzania. Norconsult Tanzania Limited, Dar es Salaam. www.ustr.gov/html/2001_tanzania.pdf.
- Technoshare Associates 2010 Baseline study of the socio-economic patterns of charcoal, wood and stove use in greater Lusaka. Lusaka Improved Cook Stove Baseline Study. Report 2007/8 German Technical Co-operation and the Programme for Basic Energy and Conservation (ProBEC). Eschborn, Germany.
- The Services Group. 2007 Audit of the implementation of the SADC protocol on trade. Southern Africa Global Competitiveness Hub, Southern African Development Community (SADC), Gaborone, Botswana.
- Tigges, L.M., Ziebarth, A. and Farnham, J. 1998 Social relationships in locality and livelihood: the embeddedness of rural economic restructuring. *Journal of Rural Studies* 14(2): 203–219.
- Timko, J.A., Waeber, P. and Kozak, R. 2010 The socio-economic contribution of non-timber forest products to rural livelihoods in sub-Saharan Africa: knowledge gaps and new directions. *International Forestry Review* 12(3): 284–294.
- Tschirley, D. and Kabwe, S. 2007 Cotton in Zambia: 2007 Assessment of its organization, performance, current policy initiatives and challenges for the future. FSRRP Working Paper 26: Food Security Research Project and Central Statistical Office. Lusaka, Zambia.
- UN Environment Programme–World Conservation Monitoring Centre (UNEP–WCMC) 2000 The tree conservation database. www.unep-wcmc.org.
- van Beukering, P., Kahyarara, G., Massey, E., di Prima, S., Hess, S., Makundi, V. and van der Leeuw, K. 2007 Optimization of the charcoal chain in Tanzania: a gap analysis. Institute for Environmental Studies, Vrije Universiteit, Amsterdam, Netherlands.
- World Agroforestry Centre (ICRAF) 2005 What is driving the charcoal industry into a dead end? Lessons from eastern Africa's unsustainable charcoal business. Eastern and Central African Policy Brief 3. East and Central Africa Regional Land Management Unit, Nairobi, Kenya.
- Whiteman, A. 2001 An appraisal of the licensing and forest revenue system in Zambia. Forest Finance Working Paper. Ministry of Environment and Natural Resources (MENR) and Food and Agriculture Organization (FAO) of the UN, Lusaka, Zambia.
- World Energy Council 2004 Survey of world energy resources 2004. Elsevier, London. www.worldenergy.org/wecgeis/publications/reports/ser/biomass.
- World Wildlife Fund (WWF) Tanzania 2008 The Dar es Salaam charcoal project: a project proposal to begin resolving the environmental crisis caused by charcoal. WWF Tanzania Programme Office, Dar es Salaam, Tanzania.
- Zambia Development Agency 2011 Wood and wood products sector report – 2009. Export Promotion and Market Development (EPMD). Zambia Development Agency, Lusaka, Zambia.
- ZFAP (1997): Zambia Forestry Action Programme (ZFAP) Volumes I & 2. Ministry of Tourism, Environment and Natural Resources. Lusaka, Zambia.
- Zimba, S.C. 2005 The contribution of the forestry sector to the copper mining industry in Zambia. *In: Proceedings from the first national symposium on timber industry in Zambia*, 90–94. Lusaka, Zambia. 29–30 September.
- Zulu, L.C. 2010 The forbidden fuel: charcoal, urban woodfuel demand and supply dynamics, community forest management and woodfuel policy in Malawi. *Energy Policy* 38(7): 3717–3730.

Annexes

Annex 1: Scoping study participants

NAME	ORGANISATION	ADDRESS	TELEPHONE	EMAIL
Davison Gumbo	CIFOR	Lusaka		d.gumbo@cgiar.org
Gillian Kabwe	Copperbelt University	Kitwe		g.kabwe@yahoo.co.uk
Mercy Kandulu	Forestry Department	Lusaka		
Kaala B. Moombe		Lusaka	0955641231 0978165620	moombekb@yahoo.co.uk
Christine Zulu	Nyimba District Women Development Association	Nyimba	0978166201	
Daniel Banda	P J Holdings Ltd	Findeco House Room, 16-17 Parirenyatwa Rd, Chipata	0977488510	bandadanny@yahoo.co.uk
Joseph Sambondu	Forestry Department	Box 120006, Kasempa	0979502557/ 0963327157	
Miriam Suntwe	Accountant	Chirundu	0977832207	msuntwe@yahoo.com
Mupelesi Siame	Business Man	UCZ P O BOX 430004, Nakonde	0976442480	chrissmupeles@yahoo.com
Muyeba Kingsley	Education Department	Chinsali	0973494708/ 0966944943	kingsleymuyeba@yahoo.com
Rex Mukunta	Forestry Department	Kazungula	0975074686	rexmukunta@yahoo.com
Serah C Lunda	Forestry Department	Chililabombwe	0955/0977613220	chilalevyson@yahoo.co.uk
Vainess Phiri	Katete District Women Development Association	Box 550161, Katete	0977967921	pvainess@yahoo.com

Annex 2: District checklist for charcoal and indigenous timber production and trade³⁹

A. Production of charcoal

1. Is charcoal produced in the district? Yes / No [circle]
2. In which of these months is charcoal produced? [Circle as applicable using the table below]

2010						2011					
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June

3. Have you noticed any change in charcoal production?

Decrease / Increase / Same or no change

4. Give reasons for your answer _____
-

5. In a given year, which months have you observed higher inflows of charcoal to the district centre?

2010						2011					
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June

6. Over the years have you observed a change in the charcoal movement in the district?

Decrease / Increase/ Same or no change

7. Give reasons for your answer _____
-

8. Of the charcoal produced in the district, approximately how much is consumed and exported?
[indicate percentage]

- a. Consumed
- b. Exported

Action	%, (percentage)
Consumed	
Exported	

9. Have you observed loads of charcoal ferried through the district? Yes / No

10. If YES, where do you think the charcoal is transported to? _____

³⁹ Replicate this for IT, or indigenous timber

11. What are the sources of charcoal coming into the district centre? [Circle applicable]

- a. Villages
- b. Chiefdoms
- c. Other districts
- d. State land

12. Who is involved in making charcoal?

- a. Households
- b. Groups
- c. Organisations
- d. Individuals
- e. Hired labour

13. Which of the following costs does a typical charcoal producer, charcoal producer-trader; and trader/vendor in your district incur in a calendar year? [mark x and indicate amount in the table below]

Cost Centre	Producer	Producer-Trader	Vendor	Indicate amount paid: ZMK
Production licence				
Conveyance licence				
Hired labour				
Rental of storage space/stall/shop				
Tokens/bribes				
Trading/selling licence				
Transport				
Transportation hire/charge				
Council fees				
Other costs, specify				

14. What markets exist for charcoal? _____

15. Who allocates markets specified in 14) above?

Market	Allocating Authority
Homestead	
Roadside markets	
Designated marketplace including stalls	
Door-to-door deliveries	
Transported to other towns (more lucrative markets)	
Verbal contracts through SMS	

16. Why are people involved in charcoal production in your district? _____

17. Are there any areas where charcoal has been produced consistently for the last 10 years in your district?

18. Which tree species are used in charcoal production in the district?

B. Distribution of charcoal

19. Who is involved in the movement of charcoal from production sites to the marketplaces?

- a. Producer household
- b. Transporters
 - i. Trucks
 - ii. Cyclists
 - iii. Ox carts
 - iv. Headload
 - v. Others
- f. Traders

C. Markets for charcoal (formal or informal)

20. Who are the buyers of charcoal in the district?

- a. Retailers-individuals
- b. Retailer-institutions
- c. End consumer
 - i. Institutions (e.g. schools, hospitals, police, prison, etc.)
 - ii. Households
- c. Wholesalers

21. What is the average price of charcoal in the district?

- a. 10 kg
- b. 25 kg
- c. 50 kg

22. What is the most common mode of payment for charcoal in the district?

- a. Cash
- b. Credit
- c. In-kind

23. In which three (3) months in the year is the price for charcoal highest in the district? *Circle all that apply*

2010						2011					
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June

24. In which three (3) months in the year is price for charcoal lowest in the district? *Circle all that apply*

2010						2011					
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June

D. Institutional/governance framework

25. Do producers get permission to produce charcoal? Yes /No

26. If YES, where do *producers* get permission to produce and/or sell charcoal?

- a. Self
- b. Household
- c. Village Headman
- d. Area chief
- e. Forestry Department
- f. Other

27. Do traders get permission to sell charcoal? Yes /No

28. If YES, where do *traders* get permission to sell charcoal? _____

29. Are there any rules regarding charcoal *production* the *district*? Yes / No

30. If YES, indicate one or two most important rules _____

31. Are there any rules regarding charcoal *trade* in the *district*? Yes / No

32. If YES, indicate one or two most important rules _____

E. General issues around charcoal and energy

33. What do people think about charcoal production? *This question is about perceptions about charcoal, e.g.:*

- a. As a livelihood source
- b. As a business / occupation
- c. As a symbol in society
- d. About those involved in charcoal production (producers) and trading (traders, transporters, etc.)

34. What types of energy are *available* in the district?

- a. Charcoal
- b. Coal
- c. Cow dung
- d. Electricity
- e. Firewood
- f. Gas

Annex 3: Participants in district validation meetings

District Level
District Commissioner's Office
CEO – District Council
Chairperson – District Council
Chairperson – District Natural Subcommittee
Planning Officer – District Council
District Planner – DC's Office
Charcoal producers – from villages
Charcoal transporters – long
Charcoal transporters – short
Charcoal traders – into district centres
Charcoal retailers – in district centres
DFO – Forest Department
Licensing Officer – Forest Department
District Farmers' Association
District Agricultural Officer
NGO representatives
Community Development
Women's Advocacy groups e.g. Women for Change
Chief (Retainer?)*
Support Staff
Zambia Revenue Authority
PEO's Office, Forest Department
Research Assistant

Annex 4: Terms of Reference for the study

Ministry for Foreign Affairs
Department for Africa and the Middle East
Unit for Southern Africa

Terms of Reference

for

A scoping study in Eastern, Northern and Northwestern Provinces for understanding dynamics of the charcoal and indigenous timber trade in connection to integrated forest management

Background

There is increasing concern of both local and international institutions about the alarming situation of deforestation and forest degradation in Zambia. The general failure of the heavily centralised top-down approach in forest resource management to arrest the losses of forest resources in Zambia, and thereby imperilling livelihoods, has led to a search for alternative forest management regimes. Some approaches, e.g., joint forest management (JFM) and Community Based Natural Resources Management (CBNRM), have been tried and tested in Zambia with mixed results. The single and most important lesson drawn from the pilots is that strong policy, legal frameworks and downward looking local administrations system are needed if the communities are to be involved in and benefit from forests. One of the vestiges of JFM is Statutory 46 of 2006 which, in the absence of a more community sensitive and substantive Forest Act,⁴⁰ provides a basis for community involvement in forest management (GRZ 2006).⁴¹ The involvement is not limited to forest reserves but covers open and customary forests as well. Using this as a leaning post and combining it with the tried and tested principles of CBNRM, it is possible to formulate an approach that is not only holistic but also provides for stronger institutional collaboration (promoting local to local and local to national linkages) on the basis of the resources available.

Integrated forest management (IFM) is about people and therefore the process of putting it in place must be participatory (Turton and Farrington, 1998)⁴² and essentially incorporates conservation, food security and income generation objectives among other issues. Communities should be able to get incentives from all aspects in IFM, which also will ensure tangible benefits and results that contribute towards sustainable development. Examples of successful IFM are few and far between but IFM, if planned properly, should integrate an understanding of the principles operating within natural and social systems will most likely succeed (Meinzen-Dick *et al.* 2002).⁴³ Thus, the first task of integrated forest management is to bring

40 The Forest Act of 1999 which provides for people's participation in forestry management was accepted by the Zambian parliament but was never signed into law.

41 GRZ 2006. Statutory 46 of 2006. Lusaka, Zambia

42 Turton, C. and Farrington, J. 1998. Enhancing rural livelihoods through participatory watershed development in India. Natural Resources Perspectives 34. ODI, London.

43 Meinzen-Dick, R., Knox, A., Place, F. and Swallow, B. 2002. Innovation in natural resource management: the role of property rights and collective action in developing countries. International Food Policy Research Institute (IFPRI). Washington, DC.

experts and expertise together in ways that produce clear options for achieving management goals. This means breaking down disciplinary walls and establishing effective communication among specialists so that they can work in integrated teams. Integrated management is necessary to move beyond rigid land allocation as there are always more candidate uses than there are potential 'pure' zones for them. Integrated forest management allows more human satisfaction to be extracted from scarce forest land. Integrated forest management acknowledges that people have long been an integral part of forested landscapes. It supports rural livelihoods, lifestyles and cultures while contributing to a sustainable economy. And integrated forest management helps forested landscapes pay for themselves – a desirable quality in today's capitalist society.

More background information and justification of the relevance is in the concept paper of the Scoping study (attached).

Objective of the scoping study

The objective of the scoping study is to *identify key issues pertaining to the interplay between and among charcoal and timber production and trade, potentially marketable wood and non-wood-based products including pointers for value chain analyses, and forest management while determining the implications on livelihoods and the resource base.*

Focus of the scoping study

More specifically the scoping study will focus on the following:

- a. Establish as far as possible the scale and extent of production and trade of commercial timber, charcoal and other non-wood forest products harvesting in the selected provinces
- b. Identify the agencies and organisations of and for the people at the local level involved in charcoaling, commercial timber extraction, harvesting of other non-wood forest products and trade and the types of support and services provided
- c. Examine the policy and institutional arrangements governing charcoaling, commercial timber extraction, and other non-wood forest products and trade at national, provincial and district levels and establish how they are perceived at the village level
- d. Working with current revenue collection systems and determine whether there are any losses at local (village), district and national levels from charcoal, other non-wood forest products and commercial timber trade
- e. Identify the threats, opportunities and constraints regarding the extent and quality of local forest estates
- f. Using CIFOR's charcoal concept note and Work Packs, draw recommendations on specific research and development activities that should be carried out under potential IFM projects.

Additional issues

Cross-cutting Issues – Inclusion of the cross cutting issues, i.e. gender, good governance and role of the vulnerable families, in the scoping study

Methodology

Broad approaches at each site will include key informant interviews (pit sawyers and charcoal producers), government officials, focus group interviews and review of forest inventory reports. Ultimately, the current approaches to forest management in the selected districts have to be understood against the background of charcoal production and logging.

To this end, existing and aggregated data sources from:

- Central Statistical Office
 - national census reports and the Living Conditions Monitoring Surveys Reports
- Forestry Department and Consultants
 - reports on sustainable biomass yield by forest lands and biomass off take
 - Integrated Land Use Assessment
- Timber producers
 - Association of Zambia, Lumber Association of Zambia, Timber Millers Associations of Zambia; Mining Companies etc.
- Interviews of chiefs, FD officials, charcoal producers, pit sawyers, transporters, and vendors etc.
- Deployment of Frontline SMS to obtain up to date information on timber, charcoal and other non-wood forests (selected) will be gathered through real time reporting.

The scoping study team will disseminate the results to the probable Pre-programme formulation (PPF) study teams before the teams start their field work. The purpose of the meeting is to share experiences during the scoping study and ensure the compatibility of the results of all the studies.

Work plan

The scoping study team is expected to propose a detailed work plan and the work plan should determine clearly the sequence of the events and also the responsibilities within the team (see Annex 1).

Expertise required

The successful completion of the appraisal requires in depth knowledge/expertise of:

1. Senior researcher
A senior researcher in CIFOR will provide oversight quality control
2. Scientist
Will be directly responsible for the entire scoping work and will cover all national-level consultations/ interviews and meetings of government officials. Will call and lead most of the planning and review meetings
3. National consultants (3)
One national consultant will be responsible for a province and will carry out the key informant interviews and focus group discussions
4. **9 Research Assistants** (district based)
Will carry out focus group discussions; key informant interviews and household surveys at the district level and communities. They will also provide real time data on the commodities being moved through Frontline SMS.

Deliverables

The scoping study will have the following outputs

1. A subjective understanding of the inventory of stocks and productivity of charcoal, timber and selected non-wood forest products in a defined forest area (based on interviews with key stakeholders but no ground truthing).
2. Initial quantification of subsistence and market demand for timber, charcoal and other non-wood forest products in the respective provinces and thus their respective monetary values
3. Documentation of local knowledge and understanding of real or potential competing management actions or demands of drivers of change in land uses and stocks of charcoal, selected non-wood forest products and timber
4. Analysis of local and higher level governance structures involved in the charcoal, selected non-wood products and timber trade and how these are perceived
5. Participatory development of scenarios of demand for different charcoal and timber impacts of plausible changes in the local and macro economy
6. Determine the current revenue losses at local (village), district and national levels from charcoal, selected non-wood forest products and commercial timber trade
7. Recommendations of specific research and development activities that should be carried out under potential IFM projects.

Time schedule

The appraisal will commence in mid-June 2011 for July 31, 2011 (45 days). Altogether, it is foreseen that the appraisal would take **45 days maximum** including submission of the deliverables.

Mandate

The Consultant shall under no circumstances act as the representative of the Embassy of Finland or give an impression that it has been given such an authority.

CIFOR Occasional Papers contain research results that are significant to tropical forestry. The content is peer reviewed internally and externally.

This paper addresses the increasing concern over the contribution of charcoal production and commercial timber extraction to deforestation and forest degradation in Zambia. This scoping study notes that rural communities in Zambia are fully involved in forest management and do obtain direct incentives from these forests, a critical condition for realising sustainable forest management. With traditional systems for forest management under siege and resources allocation and control for both charcoal and commercial timber transferred to the state, the general failure of the heavily centralised top-down approach to arrest losses of forest resources in Zambia is imperilling the livelihoods of scores of rural households. Charcoal production is licensed by the Forest Department with limited inputs from local authorities especially in terms of monitoring. Arrangements for extraction of commercial timber fall under the same arrangement but differ with charcoal in that applicants have to travel to Lusaka. The contribution of charcoal to forest loss and environmental degradation is almost a given, but the study notes that this activity, now widely practised across the country, has several hidden social and economic benefits for rural households. It is likely to continue in the future but strong policies and legal frameworks which provide power and authority to local-level institutions are likely to address the problems associated with these activities. Rural communities and their associated local-level institutions should take an active part in the management of the key forest resources and should benefit as outlined in law. It is proposed that approaches be formulated that should not only be holistic but must also provide for institutional collaboration (local-to-local and local-to-national linkages) to manage the resources available.

This research was carried out by CIFOR as part of the CGIAR Research Program on Forests, Trees and Agroforestry. This collaborative program aims to enhance the management and use of forests, agroforestry and tree genetic resources across the landscape from forests to farms. CIFOR leads the program in partnership with Bioversity International, CIRAD (Centre de coopération internationale en recherche agronomique pour le développement), the International Center for Tropical Agriculture and the World Agroforestry Centre.

cifor.org

blog.cifor.org



MINISTRY FOR FOREIGN
AFFAIRS OF FINLAND



Center for International Forestry Research

CIFOR advances human wellbeing, environmental conservation and equity by conducting research to inform policies and practices that affect forests in developing countries. CIFOR is a CGIAR Consortium Research Center. CIFOR's headquarters are in Bogor, Indonesia. It also has offices in Asia, Africa and South America.

